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ABSTRACT

This volume describes the process, findings, and implications of a complex research project known as the Beginning Teacher Evaluation Study (BTES). A major contribution of the study is its focus on Academic Learning Time (ALT) as a measure of learning. ALT is the amount of time a student spends engaged in academic tasks of appropriate difficulty. The study began as a search for information on which to base policy decisions regarding desirable competencies for beginning teachers. For a variety of reasons the study began to focus on second- and fifth-grade mathematics and reading and on experienced, rather than beginning, teachers. The book is divided into three parts with 14 chapters, each by a different author or group of authors. The first describes and analyzes the findings of the study and connects them to a growing body of literature on the importance of time as a key influence on learning. The second explores what the study might mean to teacher educators, staff developers, teachers, and principals. The third section moves the research findings into the schools: a teacher and a principal describe how they use the findings. In addition, policy-making and dissemination are discussed as two essential concerns of large-scale research on teaching and learning, such as the BTES. (Author/MLF)

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TIME TO LEARN

Carolyn Denham and Ann Lieberman
Co-Editors

California Commission for
Teacher Preparation and Licensing

A review of the Beginning Teacher
Evaluation Study, conducted with funds
provided by the National Institute
of Education

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Opinions expressed in this volume are those of the authors and do not necessarily reflect the position or policy of the National Institute of Education or the California Commission for Teacher Preparation and Licensing.

Introductory Note

This volume describes the process, findings, and implications of a complex research project known as the Beginning Teacher Evaluation Study (BTES). The 6-year study was funded by the National Institute of Education through the California Commission for Teacher Preparation and Licensing.

A major contribution of the study is its focus on Academic Learning Time (ALT) as a measure of learning. ALT is the amount of time a student spends engaged in academic tasks of appropriate difficulty. It is not surprising, perhaps, that the study found ALT related to student achievement. But on visits to classrooms one is likely to see students spending large amounts of time not engaged in learning.

The notion that students should be observed to see how much *time* they spend learning is an idea perhaps neglected by teachers or by those who evaluate or comment on teaching. The BTES research implies that it is not only possible but also important to look at Academic Learning Time. A teacher who observes his or her own classroom with ALT in mind may see new solutions to teaching problems. When educational questions such as group versus individual instruction are considered in light of ALT, new perspectives may emerge. This book explores these and other implications of the Beginning Teacher Evaluation Study.

The study began as a search for information on which to base policy decisions regarding desirable competencies for beginning teachers. Although the initial title for the study was retained, early stages of the effort revealed that attempting to identify a single set of competencies for all beginning teachers was an inappropriate task. Early research results pointed to the need for a better understanding of the nature of instruction and effective teaching practices as they related to specific grades and specific subject matter. For a variety of reasons the study began to focus on second- and fifth-grade mathematics and reading and on experienced, rather than beginning, teachers. As a result, the study provides perhaps the most comprehensive effort to date describing teaching and learning in these grade and subject levels.

The BTES did not, nor was it intended to, provide "magic answers" about how to improve the nature of education. It did not address grade levels or subject areas other than those mentioned above. Although there are significant contributions of the study, such as the concept of Academic

Learning Time, no prescriptions for successful teaching are intended. Perhaps the greatest BTES contribution may be that it reveals a much clearer picture of instruction and its consequences than was available heretofore. Thus, it provides a better basis on which teachers, administrators, researchers, teacher educators, and others can make decisions regarding their practices and policies.

The book is divided into three parts. The first describes and analyzes the findings of the study and connects them to a growing body of literature on the importance of time as a key influence on learning. The second explores what the study might mean to teacher educators, staff developers, teachers, and principals. The third section moves the research findings into the schools; a teacher and a principal describe how they use the findings. In addition, policymaking and dissemination are discussed as two essential concerns of large-scale research on teaching and learning, such as the BTES.

Marjorie Powell, former coordinator of the study for the California Commission for Teacher Preparation and Licensing, gives a brief history of the project.

Charles Fisher, David Berliner, and their colleagues at Far West Regional Laboratory for Educational Research and Development summarize their research findings. The Far West Laboratory built on the work of the Educational Testing Service in the early stages of BTES and was responsible for the conduct of research activities over the last 4 years of the project.

Walter Borg, Utah State University, reviews the literature on time and learning. He shows how BTES makes a unique contribution to research on allocated time and time-on-task and how it builds on the theoretical work of Carroll, Bloom, and Wiley and Harnischfeger.

Thomas Romberg, University of Wisconsin, first explains how the Academic Learning Time model represents an advance in thinking about teaching and learning and then discusses the limitations of the model. He concludes with an analysis of implications of the study for researchers, practitioners, and policymakers.

James Block, University of California, Santa Barbara, argues that one of the most promising aspects of the study is its emphasis on academic tasks the student can perform with success. Block relates BTES findings to Benjamin Bloom's mastery learning theory.

Barak Rosenshine, University of Illinois, analyzes BTES data related to time and considers ways to restructure use of time in schools to improve instruction. He discusses the difficulties of making changes in use of time in schools.

Gary D. Fenstermacher, Virginia Polytechnic Institute, argues that bridging the gap between research and practice by making rules—such as a rule that students engage in a given amount of ALT–is debilitating and leads to misuse of the study's findings. He maintains that it is better to bridge the gap by providing practitioners with a way to structure their experiences and observations.

Karen B. Kepler, Teachers College, Columbia, offers a teacher education perspective on the weaknesses and strengths of the study. She discusses limitations in its direct applicability to preservice teacher education but also examines its contribution as a framework for examining preservice education practices.

Lynn Miller, Northwestern University, sees BTES as a lens through which to view activities of teachers and students. She believes that staff development should be a nonprescriptive process in which teachers are active participants in their own professional development. She describes the potential and limitations of BTES as one tool for staff development.

Richard C. Williams, University of California, Los Angeles, examines the role of the principal in implementation of new practices based on BTES research. Many of his suggestions are based on two major studies of innovation: the I/D/E/A Study of Educational Changes and School Improvement and the RAND Corporation Study of Federal Programs Supporting Educational Change.

M. Frances Klein, Pepperdine University, briefly reviews various curriculum theories and describes BTES as an element of one or more curriculum approaches.

Raquel Muir, a sixth-grade teacher in Santa Monica, California, reports on 3 years experience using BTES ideas in her sixth-grade classroom. She speaks of BTES concepts as tools that can be used by teachers with a variety of teaching styles.

Pamala M. Noli, an elementary school principal in Madera, California, shares what she has learned from attempts to encourage teachers to increase students' time-on-task. She stresses the need for collaborative decisionmaking and the need to address the trauma associated with implementing innovations such as BTES-based instructional changes.

Ann Lieberman, Teachers College, Columbia University, discusses the difficulties of joining together the worlds of the researcher and practitioner. She suggests that a dialogue between practitioner and researcher replace the more common practice of one-way dissemination.

Carolyn Denham, California State University, Long Beach, suggests how the findings might be considered by the California Commission for Teacher Preparation and Licensing and other policymaking bodies such as legislatures and school boards. She also describes policies that would be, in her opinion, misuses of the research.

In a long-term project as complex as this one, scores of people made contributions. We cannot attempt to acknowledge all the many contributors to the project. We are especially aware that without the participation of many students, teachers, principals, and advisers, such a study could not have been accomplished.

Both the Educational Testing Service and the Far West Laboratory for Educational Research and Development exhibited tremendous research expertise and practical insights in the research and dissemination phases. Joseph Vaughan, NIE Project Officer, encouraged and nurtured not only the research but also the dissemination phase.

Peter LoPresti, Executive Secretary of the California Commission for Teacher Preparation and Licensing, has been continually supportive of the unique collaboration between a State agency and a research organization.

The Commission for Teacher Preparation and Licensing as a whole has been actively involved throughout this study. They are to be commended for their efforts to support and maintain collaboration among all participants.

All aspects of the study are described in more detail in technical reports, and selected aspects of the research are described in a series of newsletters. Material relating to this study can be obtained from the following address:

BTES
Commission for Teacher Preparation and Licensing
1020 "O" Street
Sacramento, California 95814

Most of this material is available without cost.

Carolyn Denham and Ann Lieberman
Co-Editors

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11

The Beginning Teacher Evaluation Study: A Brief History of a Major Research Project

Marjorie Powell

The California Commission for Teacher Preparation and Licensing (CTPL), established in 1970, is responsible for issuing and revoking teaching credentials and approving programs of teacher education. The 15 voting members, appointed by the governor, are school teachers, faculty of higher education institutions, school board members, and private citizens. Five ex officio members are appointed by five State education agencies.

Within legislative constraints, CTPL is also responsible for establishing standards both for issuance of credentials and for approval of teacher education programs. Limited research on teaching, competing philosophical statements about important teaching skills, the need to find justification for the standards adopted, and the growing interest in the competency-based teacher education movement led CTPL, shortly after its formation, to undertake a research effort to identify teacher competencies.

An initial planning grant was obtained from the U.S. Office of Economic Opportunity to identify teacher competencies in the teaching of reading. After the establishment of the National Institute of Education in 1972 as the Federal agency responsible for educational research and development, funding for the research was moved to NIE.

Goals

Initially, a study was planned to fulfill two purposes simultaneously: the identification of generic teacher competencies and the evaluation of teacher education programs through followup of graduates of those programs. The intended focus on recent graduates of teacher education programs resulted in the name of the research effort, the Beginning Teacher Evaluation Study (BTES).

As the research progressed, the goals changed. The work of an early planning conference convinced CTPL to leave program evaluation to another effort and to focus on identifying and describing teaching skills and their impact on student outcomes. By the third year of the fieldwork, the focus on identification of teaching skills was expanded to include other goals: fostering research on teaching and teacher education, enhancing communication between researchers and educators, and modeling effective interagency cooperation. Although the focuses on both evaluation and, later, beginning reachers were dropped, the title of BTES was retained.

Planning the Research—1972-73

Early decisions influenced, directly and indirectly, both the design of the research and the administration under which the research occurred. The commission staff initially developed a research plan that was reviewed by researchers, school district personnel, teacher educators, and members of several educational organizations. They suggested major revisions in the plan.

Next, a contractor developed a revised plan, incorporating recommendations from the planning conference group and additional changes. The contractor recommended that the research focus on grades two and five, to provide some information about whether the teacher skills were equally important at those two grade levels. To make it possible to generalize the results further across teaching situations, the contractor also recommended that the study consider the teaching of mathematics as well as reading. These four areas, reading and mathematics at grades two and five, remained the focus of the research effort throughout the study. The contractor's research plan called for an initial year of fieldwork to identify teacher skills using a sample of experienced teachers, and to validate the list of skills with a second sample of experienced teachers. A sample of beginning teachers was to provide information about realistic entry levels in the identified teaching skills.

Administrative decisions made at this time also influenced the structure of the research system throughout the study. The CTPL members decided to select contractors (through a request-for-proposals process) to conduct the research, rather than establish their own research staff. A research advisory board was to provide advice about research decisions before they were made, while a second contractor was to conduct a program audit of the activities of each major research contractor.

Initial Fieldwork – 1973-74

The Educational Testing Service (ETS) of Princeton, New Jersey, conducted the first year of fieldwork. Data collection covered five major areas: student achievement in and attitude toward reading and mathematics; student background and characteristics; teacher background and characteristics, including teacher verbal behavior; school background and characteristics, including school climate and support services; and teacher behaviors within the classroom. A sample of 93 teachers was observed from two to eight times with two observation systems, and classes were videotaped during reading and mathematics instruction. Information about teacher and student background, teacher decisionmaking processes, school climate, and program support was collected, and student achievement and attitude were measured in the fall and spring.

In 1973-74 CTPL convened the research advisory board, composed of leading researchers and practitioners in California and from other areas of the country. Some members of the board were retained throughout the study to provide historical perspective and extensive knowledge of the research; new members rotated into the board with additional perspectives and fresh ideas. The CTPL, retaining its authority for all major decisions on the nature of the study while seeking to obtain a range of arguments for and against any action, sought advice from each member of the board–rather than unanimous recommendations–about research plans, data collection, instruments, and interim and final reports. The process of board review, although seen as essential, did, however, add considerably to the time necessary to complete any step of the research and had to be considered in developing time schedules.

A separate program audit firm collected information and submitted reports that provided CTPL and NIE with an additional perspective on the research effort, one that assessed completed portions of the research activities. The review mechanism provided a tool for future decisionmaking in the project.

Additional Fieldwork–1974–76

The 1973-74 research was developed from a traditional view of teaching, incorporating measures of teacher characteristics and behaviors from previous research and from educational psychology. With research advisory board encouragement, another year of fieldwork was planned during which different perspectives on teaching would be used to identify additional variables for study. With NIE approval of the revised schedule, CTPL selected the Far West Regional Laboratory for Educational Research and Development (FWL) in San Francisco, California, to conduct this research to identify other important teaching variables and to validate the nature of the teaching skills already defined. This fieldwork was also subject to a program audit. From that point, FWL conducted all research.

During the 1974-75 work, a volunteer sample of 200 teachers, 100 in each of grades two and five, taught 2-week units in reading and mathematics. Using the data on teacher behavior and on student achievement on the unit content as a guide, a sample of 40 teachers was identified: 10 teachers at each grade level were considered to be more effective in teaching the units and 10 at each grade level were considered less effective. These 40 teachers then participated in three special studies. In one study, trained ethnographers spent a week in each classroom recording their observations. The second study, concerned with teacher planning and decisionmaking for and during instruction, gave teachers the simulated task of planning for a year of instruction for a sample of students. They were also asked to watch a videotape of one of their own lessons and to recall and discuss the decisions they had made during the instruction. In the third study, teachers and students watched videotapes of different teaching styles and identified important aspects of teaching.

During 1974-75, a pilot study was recommended to clarify a major concept emerging from the research: instructional time. The research staff also recommended additional work to develop (1) tests of student achievement that were more sensitive to the instruction, and (2) simpler and more accurate instruments for collecting time information from teachers. The CTPL members, the research advisory board, and NIE agreed to revise the research schedule once more. A small study of time concepts and data collection procedures and a revision of the student achievement tests were completed during the 1975-76 school year with a sample of 30 teachers in grades two and five.

Final Field Study–1976–78

Plans for a field study were then developed from the work of the Far West Laboratory and ETS and from a review of other recent research. Several research findings pointed to a need for intensive observation in a smaller sample of classrooms than had originally been planned. The final field study involved approximately 25 teachers in each of grades two and five. Data collection occurred during the 1976-77 school year, and data analysis the following year.

In each classroom, six students who were similar in entering achievement were selected. These students completed achievement tests and attitude measures in October, December, May, and the following fall. Between tests the teachers maintained records of time allocations and difficulty level of reading and mathematics tasks and also reported on their planning in weekly interviews. Weekly observations focused on time allocation, student engagement on tasks, task difficulty, and teacher behaviors directed to the observed students. Each of these variables is defined and discussed in later chapters.

These data collection activities resulted in a comprehensive data base to be analyzed and a complex set of interrelated decisions about data analysis. To provide CTPL with advice about the appropriateness and feasibility of the data analysis, a subgroup of the research advisory board reviewed in great depth the results of completed analyses and the plans for future analyses. On the basis of this thorough consideration of alternatives from a variety of perspectives, the data analyses were done.

Dissemination

During the first several years of the study, CTPL provided information about the study primarily through publication of the *BTES Report*, designed to provide executive summaries of the various technical reports submitted as part of the research effort, and the *BTES Newsletter*, designed to communicate future research plans and discuss research results with a range of audiences. Staff members of CTPL, ETS, and the Far West Laboratory made presentations about the study to a variety of organizations within California and at national professional meetings.

Although several alternatives for final review of research results and appropriate dissemination plans had been discussed periodically, formal planning for dissemination efforts began with the convening in 1976 of a research utilization board composed of school personnel, teacher educators, and researchers. Based on their recommendations, CTPL staff developed a dissemination plan for the 1978-79 and 1979-80 school years. The dissemination activities will involve members of the target audiences—teacher educators and school personnel—in consideration of the implications of the research results for teacher education and for teaching. In addition, a minigrants program was implemented in the summer of 1979 to provide support for a diversity of practitioners who wish to attempt instructional changes based on findings of BTES.

Although goals, time schedules, and research plans have evolved and changed over the several years of the research effort, the study has identified a number of important aspects of teaching, has influenced and developed new and more comprehensive means of investigating teachers' effectiveness, and has demonstrated that a State policymaking agency, a Federal education agency, researchers, and practitioner can productively engage in research on instruction as a process for practice, research, and educational policy decisions.

The remaining chapters of this book present a diversity of perspectives and opinions on the BTES and its implications.

1

Teaching Behaviors, Academic Learning Time, and Student Achievement: An Overview

Charles W. Fisher, David C. Berliner, Nikola N. Filby, Richard Marliave, Leonard S. Cahen, and Marilyn M. Dishaw

The purpose of the Beginning Teacher Evaluation Study[1] (BTES) was to identify teaching activities and classroom conditions that foster student learning in elementary schools. The study focused on instruction in reading and mathematics at grades two and five. During the multiyear series of substudies comprising BTES, a variety of issues was addressed; data from several samples of teachers and students were collected and analyzed. Depending on the question being asked, various data collection techniques were used, including ethnography, stimulated recall, interviews, teacher and student self-report, objective observation, and testing. As the study progressed, a model of classroom instruction and student learning evolved and provided the conceptual framework that guided the final empirical stage of the study. The development of the model is in itself one of the more important outcomes of the study.

This summary chapter[2] presents (1) a brief description of the model as it applies to the acquisition of reading and mathematics skills in elementary schools; (2) an overview of the methods used in the final field study; (3) the major findings of the study; and (4) some implications of the study for the practice of teaching.

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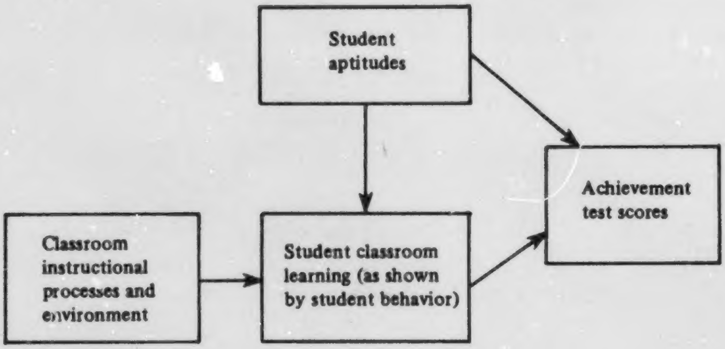
[1] Although the title of the overall research program specifies "beginning" teachers, it is important to note that the empirical work was carried out in classrooms of teachers who had several years of teaching experience. Hence, the results reported here are based on information from experienced teachers.

[2] This summary draws on approximately three dozen technical reports and notes that document various aspects of the BTES.

Figure 1.1. A Model of Classroom Instruction


Student aptitudes
Achievement test scores
Classroom instructional processes and environment
Student classroom learning (as shown by student behavior)

A Model of Classroom Instruction

This model of classroom instruction states that, for a given student, certain instructional processes lead to classroom learning, which is then reflected in achievement test scores (figure 1.1). In this model, student aptitudes have a direct impact on both student classroom learning and achievement test scores.

The general model specifies and distinguishes two measures of student learning: student classroom behavior and student achievement test scores. Learning takes place over time in the mind of the student. Test scores are one useful indicator of learning, but they are not learning itself. The model proposed here implies that learning can also be measured more directly and immediately by looking at student behavior in the classroom. Hence, the central element in figure 1.1 is student classroom learning. The model further implies that classroom instruction and environment affect student learning by first affecting the observable classroom learning behaviors of the student.

Academic Learning Time

During the study, we developed a measure of student classroom learning using observable student behavior. This measure of student learning is called Academic Learning Time (ALT) and is defined as the amount of time a student spends engaged in an academic task that s/he can perform with high success. The more ALT a student accumulates, the more the student is learning.

A concrete understanding of the Academic Learning Time concept can be facilitated by considering a practical example.[3] In second-grade mathematics it is common to teach addition. For each pupil, a certain portion of the school day is available for work on addition problems. There is clearly an upper limit on the time available during school hours for the student to work on addition. We refer to this quantity as time *allocated* to addition. The time may be structured as one continuous block or as several segments.

For some of the allocated time, the student will be actively engaged in work on addition; that is, s/he will be paying attention to the addition task. For some of the time, the student will be off task, or unengaged, for a variety of reasons. Since a student can learn only when s/he is in some way paying attention, a measure of learning time should include only time during which the student is engaged. Hence, *engaged* time represents a somewhat more refined measure of student classroom learning than the time allocated to addition. It includes that part of allocated time during which the student is paying attention.

The match between the task and the student's current knowledge level will also influence the amount learned. If the particular addition task is very difficult for the student and s/he produces few correct responses during the task, the activity will not yield much learning for that student. On the other hand, if the student produces many correct responses on the task, we hypothesize that learning is occurring. Thus the student's success rate on the task will partially determine the amount of learning.

In the fieldwork, three broad levels of success on a task were identified. *High success* describes situations where the student has a good grasp of the task and only makes occasional careless errors. If a student does not understand the task and makes correct responses at about the chance level, the situation is labeled *low success*. Situations that fall between low and high success are defined as *medium success*. Medium success involves partial understanding, where the student understands enough to produce some correct responses but also commits errors due to limitations in his/her understanding of the task.

The ALT model proposes that more time spent working with high success leads to increased achievement. However, it does not necessarily imply that all a student's time should be spent in the high success condition, nor does it imply that high success corresponds to little effort on the part of the student. In fact, high success will be attained sometimes with relatively little effort and sometimes with considerable effort. Generally, it is expected that some balance between high and medium success tasks, with somewhat *more* activities at a high success level, will produce the most student learning. Low success tasks would always be detrimental to learning.

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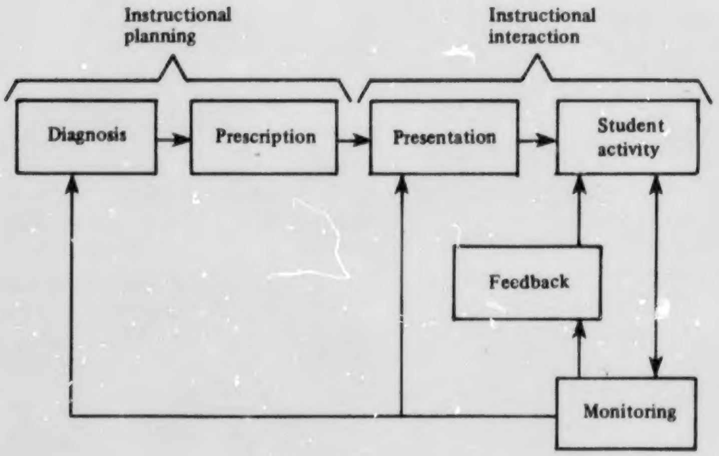
[3] The focus of this study is on student acquisition of basic skills in reading and mathematics; hence the addition example. However, in principle, student learning time relevant to other goals of schooling could be defined and measured.

To summarize, time spent by a student engaged on a task that s/he can perform with high success and that is directly relevant to an academic outcome constitutes a measure of student classroom learning. We refer to time spent under these conditions as Academic Learning Time (ALT). The basic components of ALT are allocated time, student engagement, and student high success (balanced with some medium success). The ALT model states that the accumulation of Academic Learning Time will lead to gains in achievement.

Instructional Processes

The teaching behaviors that influence student learning can be conceptualized as serving five interrelated functions. These are diagnosis, prescription, presentation, monitoring, and feedback. These functions occur through time in a roughly cyclical fasion, as shown in figure 1.2.

Figure 1.2. Instructional Functions in the Academic Learning Time Model of Classroom Instruction



The cycle of functions begins with a *planning phase*. The teacher as organizer and decisionmaker assesses the current knowledge, skill levels, and strengths and weaknesses of the student (diagnosis). S/he can then decide on appropriate instructional goals and activities, grouping and scheduling (prescription). These decisions set the stage for the interaction phase.

The *interaction* phase begins with the presentation of concepts or learning tasks to the student. The student works on the task, and the teacher monitors the student's responses to know whether the instructional goal is being achieved. Monitoring tells the teacher about the student's state of knowledge or skill during and following an instructional activity. Guided by information from monitoring, the teacher might provide feedback to the student, give additional explanation, or cycle back to the beginning for further diagnosis and prescription.

It is important to realize that each of these functions can be fulfilled by a wide range of different specific behaviors, depending on the classroom organization, the curriculum, or teacher preferences. For example, diagnosis may be accomplished by listening to a child read, talking to a child about what s/he is interested in, watching the way a student works during an independent seatwork assignment, giving formal tests, etc. What all these activities have in common is that they give the teacher information about the student. In this study we did not compare the effectiveness of different behaviors within each function: we did not, for example, look for the best way to diagnose. Instead we looked more generally at whether these functions were fulfilled. We considered whether the teacher knew the skill levels of individual students and whether s/he used that information to make reasonable program decisions. We looked at how often the teacher made presentations, monitored, and gave feedback. The model implies that it is important for these functions to be fulfilled, but that there are many acceptable ways to carry them out.

Classroom Environment

Classes may differ widely in such dimensions as enthusiasm, warmth, competitiveness, cooperation, and task orientation. These variables and many others, which are globally referred to as classroom environment, play an important role in instruction. The functional model of teacher processes, depicted in figure 1.2, operates within particular classroom environments. Differences in environmental variables may influence Academic Learning Time directly. For example, some teachers value academic pursuits very highly and, hence, provide a classroom environment that has high academic press. This press may tend to raise the general level of engagement in the classroom.

Differences in environmental variables may also affect the relationship between teaching process variables and facets of Academic Learning Time. For example, the specific behaviors constituting feedback might be very different in classrooms where the climate differs in warmth. The behaviors themselves might change, or they might be interpreted differently by students. The difference in warmth would then affect the relationship between feedback and student engagement.

Summary

Academic Learning Time is an observable measure of ongoing student learning in the classroom. The ALT model of instruction states that the accumulation of Academic Learning Time represents learning taking place and, therefore, results in increased student achievement. The model also states that teaching behaviors have an impact on student achievement by influencing the facets of Academic Learning Time (time allocation, engagement rates, and success rates). In the model, teaching behaviors are categorized according to the instructional function they fulfill–diagnosis, prescription, presentation, monitoring, or feedback. These functions occur in a cyclical pattern during instruction and each function may be fulfilled by a number of different behaviors. The model also recognizes the impact of student aptitude and classroom environment on student learning (see figure 1.1).

Overview of the Field Study

The research portion of the Beginning Teacher Evaluation Study culminated in an extensive examination of the Academic Learning Time model.[4] Student achievement in many areas of reading and mathematics was assessed in October and again in December and May. During the intertest periods a wide variety of data on teaching behaviors, classroom environments, and student classroom learning behaviors were collected.

Subjects

Volunteer teachers in schools serving middle to lower-middle social class communities were recruited for the study. The initial sample included

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[4] During the BTES, four separate samples of students and teachers were studied in four sequential years (Phase II, Phase III-A, Phase III-A Continuation, and Phase III-B). The last of these field studies, conducted during the 1977-78 school year, is summarized here. The comprehensive technical report of the study is entitled *Teaching Behaviors, Academic Learning Time and Student Achievement,* by Fisher et al., 1978.

50 second grade and 50 fifth grade teachers. A specially selected set of subscales from the BTES achievement battery was administered to students in these classes. Classes were selected for the final study sample if six students in the class (usually three boys and three girls) were in the range from the 30th to the 60th percentile in reading and mathematics, based on the total distribution of scores in this sample of classes. The selected students were predicted to show some academic growth but not reach ceiling on the subscales used in the full battery of achievement tests designed for this study (Cahen, 1977). These six target students within a class were subjects of intensive data collection throughout the academic year.

The final sample of teachers included 25 second-grade and 21 fifth-grade teachers, mostly female (about 75 percent), ethnically mixed (over 20 percent nonwhite), and varied in age, years of experience, and teaching style. Attrition, mostly from student mobility, reduced the final sample of target students to 139 in grade two and 122 in grade five. Nonwhite students constituted 40 and 30 percent of the student sample in second and fifth grade, respectively. Target and nontarget students did not differ in measures of socioeconomic status. Approximately half of the sample comprised children of skilled or semiskilled parents; another 16 percent were children of unskilled or unemployed parents.

Instrumentation and Procedures

Achievement of the target students in each class was measured with a comprehensive achievement battery in reading and mathematics (Filby and Dishaw, 1976). Each administration of the battery was carried out in four 45-minute sessions, completed over 3 schooldays. Most of the items were of the multiple choice format. Many different content areas of the reading and mathematics curriculums were represented in the 50 subtests of the second- and fifth-grade batteries. The subtests were combined and reduced to a set of 26 scales for analysis. Selected achievement scales were administered in September of the following year to assess retention. The alpha reliabilities, test-retest reliabilities, and standard errors of the scales were reported by project staff (Fisher et al., 1978) and an independent investigator (Wright and Kim, 1977).

Student attitudes toward reading, mathematics, and school were measured in the second grade by 16 items, using a 3-point response scale. These attitudes were measured in the fifth grade by 24 items, using a 7-point response scale. Alpha reliabilities and standard error of measurement on all three test administrations were acceptable for research purposes (Fisher et al., 1978).

Time allocated to reading and mathematics curriculum content categories (e.g., decoding consonant blends, inferential comprehension, addition and subtraction with no regrouping, mathematics speed tests, etc.) was recorded by teachers in daily logs. After training on logkeeping procedures, teachers recorded allocated student time per day, per content category, for all the school days between October and May. (See Dishaw, 1977 a and b for a description of procedures and summary data on allocated time).

Allocated time, engagement rates, and success rates for the target students were measured by direct observation of the target students by field observers. The observers used a time-based rotating sample procedure, recording data on specially designed optically scorable coding sheets. [Instrument development is described in Marliave, Fisher, Filby, and Dishaw (1977). Data collection procedures and descriptive statistics are documented in Filby and Marliave (1977) and in Fisher, Filby, and Marliave (1977).] In this observation system the activity of each target student is sampled once approximately every 4 minutes. The reading or mathematics curriculum content area was recorded using categories that corresponded to those of the teacher logs described above. The student's engagement (involvement, on-task behavior, attending) or nonengagement with the instructional task was coded. The student's level of success was also categorized. Success was coded high, medium, or low as a function of the particular target student's response to the current task.

Interactive teaching behaviors were also measured as part of the direct observation system. A number of variables associated with the teacher's behavior were coded if, at the moment of observation, the student and teacher were involved in some interaction. Seven interactive teaching behaviors, comprising three general categories, were coded: *presentation*, including planned explanations, unplanned explanations, and providing structuring or directions; *monitoring*, including observing student activities and questioning students; and *feedback*, including feedback about student academic responses and feedback designed to control student attention to the task. These general categories of interactive teacher behavior are three of the five general teaching functions examined in this study and described above.

Observations in a classroom were conducted for a complete day, once each week, for over 20 weeks of the school year from October to May. All observers had prior teaching or research experience. The observers, who were trained intensively for 3 weeks, were responsible for visiting eight classes, once each, over a 2-week period. Thus, each classroom was alternately visited by two different observers, and each observer was responsible for being familiar with the classroom work and behavior of 48 target students. Paired observations were also carried out throughout the data collection period, to provide reliability estimates of the observations (Filby and Marliave, 1977; and Fisher, Filby, and Marliave, 1977).

The teacher planning functions (diagnosis and prescription) were assessed from general interviews in the fall and the spring of the year, short weekly interviews, and teachers' predictions of item difficulty for target students. In addition, general characteristics of the classroom and the instructional program were rated each week by the field observer. Fifteen scales were used to measure such variables as classroom cooperation, cognitive task orientation, the teacher's clarity of presentation and abruptness toward students, and the teacher's knowledge of subject matter. Extensive preliminary analysis was done to define and select variables for inclusion in relational analyses (Filby and Cahen, 1977, 1978).

The major analysis of these data assessed relationships between (1) facets of Academic Learning Time and student achievement and (2) teaching behaviors and student learning, as measured by ALT and student achievement. Relationships in the data were identified using a number of methodological strategies; however, most of the analyses were cast in the form of the multiple linear regression model (Marliave et al., 1977 a and b; Filby and Cahen, 1977, 1978; and Fisher et al., 1978).

Findings

Fourteen major findings from this field study are organized in two groups. The first set of findings reports relationships between Academic Learning Time and student achievement. The second set covers teaching processes and classroom environment in relationship to student learning.

Academic Learning Time and Student Achievement

The amount of time that teachers allocate to instruction in a particular curriculum content area is positively associated with student learning in that content area.

Teachers who allocate more time to a particular content area of the curriculum have students who achieve at higher levels than teachers who allocate less time to that content area. Very large differences in time allocation were observed between classes. For example, the average amount of time allocated to mathematics in second-grade classes varied from 25 minutes per day in one class to 60 minutes per day in another class. In fifth grade reading and reading-related instruction, the average amount of allocated time was found to vary from about 60 minutes per day in some classes to about 140 minutes per day in other classes.

Within reading and mathematics, classes differed in the amount of time allocated to different skill areas. For example, in one second-grade class the average student received 9 minutes of instruction over the whole school year in the arithmetic associated with the use of money. This figure can be contrasted with classes where the average second grader was allocated 315 minutes per school year in the curriculum content area of money. As another example, in the fifth grade some classes received less than 1,000 minutes of instruction in reading comprehension for the school year (about 10 minutes per day). This figure can be contrasted with classes where the average student was allocated almost 5,000 minutes of instruction related to comprehension during the school year (about 50 minutes per day).

The differences in time allocations at the level of "reading" and "mathematics" and at the level of specific subcontent areas are substantial. These differences in how teachers allocate time are related to differences in student learning. Other things being equal, the more time allocated to a content area, the higher the academic achievement.

The proportion of allocated time that students are engaged is positively associated with learning.

Allocated time sets an upper bound on the amount of inschool learning time a student has. Student nonengagement operates to reduce actual learning time below this upper bound. Within the reading period, for example, students pay attention to the task only part of the time. The percentage of the time that students are engaged is related to learning. Students who pay attention more learn more.

This basic fact is not very startling; without attention, little can be learned. However, the data reveal that the average rate of engagement varies widely across classes and among individual students. For example, during reading and mathematics instruction there were classes that had an average engagement rate of about 50 percent. This means that students were attending to their work only half of the time. In other classes, the average engagement rate approached 90 percent. In other words, two classes might allocate the same amount of time to reading instruction, but one class might have almost twice as much real engaged learning time as the other. Since engagement rate has been shown to be highly variable across classes and since that variability has been empirically related to achievement, it is possible that increasing engagement rates will lead to increased achievement.

The proportion of time that reading or mathematics tasks are performed with high success is positively associated with student learning.

Three rather broad categories, described above, were used in this study to define the difficulty level of the material or activities for individual students: high success, medium success, and low success. Our findings consistently point out the positive effects of school tasks that are performed with high success; i.e., correctly. Other research on instructional design has stressed the importance of high success rates. High success rate in scholastic activities has also been found to be one of the factors that contributes to high levels of student self-esteem.

The average student in the study spent about half the time working on tasks that provided high success. In grade five mathematics, the average was somewhat less–about one-third of instructional time was high success. Students who spent more time than the average in high success activities had higher achievement scores in the spring, better retention of learning over the summer, and more positive attitudes toward school.

The idea of success rate is more understandable if one thinks about the cyclical nature of learning. Learning is a process of moving from not knowing to knowing. When new material is introduced the student most likely will not understand completely and will make some errors. Guided practice and/or explanation help the student understand, and s/he comes to make fewer errors. Eventually, the student will perform correctly, although probably with some effort. Learning will become well established and further work will be practice or review; this stage could be viewed as one of consolidation. At some later point, the student knows the material so well that further practice is of minimal value; it is time to move on to something new. Our results suggest that for learning of basic skills in the elementary grades, the stage of *successful practice* (consolidation) is particularly important to the thorough mastery of concepts and procedures.

Although we have emphasized the importance of giving students ample opportunity for successful practice, we must point out that it would not be desirable for students to spend all of their time on tasks they can perform completely correctly. Common sense suggests that too high a rate of high success work might be boring and repetitive and could inhibit the development of persistence. Probably, some balance between high success and more challenging work is appropriate. Also, we found that older students and/or students who were generally skilled at school learning did not require as high a percentage of time at the high success level. Apparently these students had learned problem solving–how to take a task they did not completely understand and work it out. Such students are able to undertake the challenge of more difficult material, as long as they eventually experience success.

The proportion of time that reading or mathematics tasks are performed with low success is negatively associated with student learning.

When students worked with materials or activities that yielded a low success rate, achievement was lower. In this study, no teacher assigned a high proportion of materials that were exceptionally hard for students. However, some students worked on materials judged to be excessively difficult for them as much as 20 percent of the time. Other students never worked at a low success rate. Students who were observed to spend more time on excessively difficult material generally learned less than other students. It is seldom, if ever, desirable for elementary level students to be given tasks in which they experience low success.

> ***Increases in Academic Learning Time are*** **not** ***associated with more negative attitudes toward mathematics, reading, or school.***

The data from this study revealed that students with high and low rates of allocated and engaged time were equally likely to have positive or negative attitudes toward the subject matter and the school. Educators are naturally concerned about whether greater than average time in academic pursuits or greater than average rates of attention will result in negative attitudes. In the current study, that did not happen. In fact, there is one consistent, positive trend in the data. It appears that students experiencing high rates of success are somewhat more likely to have an increasingly positive attitude toward reading, mathematics, and school.

Summary. The first five findings are concerned with measures of ongoing student learning and their association with student achievement. Academic Learning Time is an important predictor of student achievement. Allocated time, engagement rate, and success rate on school activities are all associated with student achievement. Students who accumulate more Academic Learning Time generally have higher scores on achievement tests. This means that Academic Learning Time can be interpreted as an immediate, ongoing measure of student learning. Also, students do not generally develop negative attitudes when they have large amounts of Academic Learning Time, and high success may contribute to positive attitudes.

Relationship of Instruction Processes and Classroom Environment to Student Learning

Both student achievement and Academic Learning Time are measures of student learning. The next question is: What impact do teaching behaviors and characteristics of the classroom environment have on student learning? Student achievement, engagement rate, and success rate were all used as measures of aspects of learning. Measure of the five teaching functions and of classroom environment were related to these outcome measures. This section reports major findings.

The teacher's accuracy in diagnosing student skill levels is related to student achievement and Academic Learning Time.

Teachers were asked to predict how their students would do on certain test items used in the achievement battery. This accuracy in predicting student performance was used as a measure of the teacher's diagnostic ability. A positive relationship was found between a teacher's diagnostic ability and the reading and mathematics achievement of students. Diagnostic ability probably relates to student achievement by working, in part, through student Academic Learning Time. The teacher's diagnostic ability was negatively related to low success rate (that is, the better the teacher was as a diagnostician, the less likely s/he was to prescribe materials that were extremely difficult). The diagnostic ability of the teacher was also positively related to student engagement. Among teachers in this sample, the better diagnosticians generally had students who showed higher rates of engagement. The evidence, although not always consistent, suggests that improving the teacher's ability to make an accurate assessment of student performance would have positive effects on student learning.

The teacher's prescription of appropriate tasks is related to student achievement and student success rate.

The classroom observers in this study rated the "appropriateness" of instruction in the classes they examined. In making these ratings, they were asked to think about how reasonable the instruction was for those particular students; that is, whether the instruction generally matched the needs and skill levels of individual children. This rating of appropriateness generally was positively related to achievement. Appropriateness in prescribing learning activities probably relates to student achievement partly because of the relationship between appropriateness and Academic Learning Time. Appropriateness of prescription was related to the proportion of time students had low success on their work: higher ratings of appropriateness were always associated with less frequent occurrences of very hard material.

More substantive interaction between the student and an instructor is associated with higher levels of student engagement.

Substantive interaction between teachers and students consisted of presentation of information on academic content, monitoring of work, and feedback about performance. Most student-teacher interaction took place in a group setting, with only a small part of such interaction occurring during seatwork as one-to-one "tutoring." Students who spent more time in a group setting had higher rates of engagement. When group time was characterized by high levels of substantive interaction (as opposed to organizational tasks or waiting for others), engagement rates were higher during groupwork *and* during seatwork. When students received more contact with an instructor during seatwork, engagement rates were higher in seatwork. Engagement rates were especially low when students spent two-thirds or more of their time in seatwork and had little interaction with an instructor. The use of aides, parent volunteers, cross-age tutors, and peer tutors increases the amount ot interactive instruction and can be presumed, therefore, to keep engagement rates higher. Thus this finding has implications for class size, individualized instruction, use of aides, and grouping practices. Those allocations of resources and those organizational arrangements that allow for more substantive interaction between instructor and student will be preferred because of the positive association of substantive interaction with student engagement.

Academic feedback is positively associated with student learning.

Academic feedback was defined as information given to the student about whether his or her answers were right or wrong. Many different specific behaviors fulfilled this function, including answering questions in class, checking papers, using programmed texts, and listening to oral reading. The percentage of instructional time during which the student received feedback was positively related to student engagement rate and to achievement. Hence more academic feedback may lead to higher engagement and achievement.

Structuring the lesson and giving directions on task procedures were positively associated with high student success.

Teachers who gave directions more often and spent time discussing the structure of the lesson had students who showed a greater rate of high success. Anecdotal reports suggest that students sometimes do not know what they are supposed to be doing or how they are supposed to mark a particular worksheet. Clarifying activities by the teacher can help raise student achievement by affecting the high success rate component of Academic Learning Time.

Explanation specifically in response to student need is negatively associated with high student success.

One teaching behavior was explanation in response to student need. This occurred when a student did not understand something and the teacher explained it to him. Most explanation-need occurred during seatwork. Students who received more explanation in response to need tended to have fewer high success tasks and more low success tasks. From a slightly different perspective, a student who had more need received more explanation in response to need. Apparently, though, the explanation did not solve the problem since, in the long run, the student had little high success. Frequent need for explanation may be a signal that changes are needed in the student's instructional program, either in the difficulty of the assignments or in preparation for seatwork.

> ***More frequent reprimands for inappropriate behavior are negatively associated with student learning.***

The study examined the impact of task engagement feedback or "information given to the student about whether his behavior was acceptable or unacceptable." Usually task engagement feedback amounted to a reminder to the student to get back to work. Such reminders were given more often to students who were offtask more often. They were also given more often to students for whom some tasks were excessively hard. It may be that some students are sometimes unable to do tasks they have been assigned, so they do not work, and the teacher then reprimands them for not working. Students who received more frequent reprimands also tended to show less growth on achievement tests. It is hard to imagine teaching without reminding students of the rules for acceptable behavior. However the need for frequent reminders may be a sign of trouble.

> ***The teacher's value system is related to Academic Learning Time and to student achievement. Teacher emphasis on academic goals is positively associated with student learning.***

Classes judged to have high emphasis on academic performance typically showed high levels of achievement. More of the unusually high-achieving classes, as opposed to the unusually low-achieving classes, had teachers characterized by a strong academic orientation. These classes were not necessarily "cold" or unconcerned with student feelings. They did, however, emphasize the importance of school learning. In contrast, some classes were primarily oriented toward affective outcomes, such as student attitudes and feelings. In these classes, less time was allocated to academic instruction, student engagement rates were lower, students were more likely to be given low success tasks, and student achievement was therefore lower. Nothing in these data suggests that classes should be free of affect—quite the contrary. But the evidence is clear that when teacher attention to academic instruction is substantially reduced, students achieve less.

A learning environment characterized by student responsibility for academic work and by cooperation on academic tasks is associated with higher achievement.

In classes where students took responsibility for their classwork and belongings and where students helped each other, shared materials, and worked together, achievement was generally higher. Descriptions of specific classes indicated that this relationship held most often when there was a high level of academic focus in the classroom. In other words, where students worked together to reach academic goals and where they took responsibility for achieving them, achievement was higher. Cooperation and student responsibility in nonacademic pursuits did not have this effect.

Some Implications

In this section we go beyond the major findings and discuss possible implications of the study. Our goal is to underline those issues we believe to be important for elementary education and to integrate the objective results with belief based on experience. The study used correlational methodology and, therefore, we have demonstrated no causal relationships. In this section, we make strong inferences in translating the findings into statements that can be applied to elementary school teachers and students in general.

Academic Learning Time and Achievement

A major finding of the study is that increases in Academic Learning Time are associated with increases in student achievement. The practical importance of Academic Learning Time in relationship to achievement is illustrated by an example from our analysis of grade two reading instruction. Consider a grade two student whose October reading score was average for the sample of students in the study (50th percentile). If this student experiences the average amount of Academic Learning Time (573 minutes total, or 23 minutes per day in reading), the student can be expected to show average reading achievement in December (50th percentile again). It is important to note that the "average" student with "average" Academic Learning Time does show considerable learning in terms of predicted raw scores. If this average student experiences only 4 minutes per day of Academic Learning Time (100 minutes total for the interest period), then s/he would be expected to show almost no change in raw score and would decline considerably in relative terms (50th percentile in October, 39th percentile in December). If the same student experiences very large amounts of Academic Learning Time, say 52 minutes per day, then s/he could be expected to show considerable improvement in reading achievement relative to the other students in the study (50th percentile in October, 66th percentile in December). Thus, the student with large amounts of Academic Learning Time benefits substantially. Note that the December score is an "expected" score. That is, the average December score will equal this expected score for a large group of students. However, for a specific student the actual score will vary considerably around the expected score.

It may appear that this range from 4 to 52 minutes per day is unrealistically large. However, these times actually occurred in the classes in the study. Furthermore, it is easy to imagine how either 4 or 52 minutes per day of Academic Learning Time might come about. If 50 minutes of reading instruction per day is allocated to a student who pays attention about a third of the time, and one-fourth of the student's reading time is at a high level of success, the student will experience only about 4 minutes of engaged reading at a high success level. Similarly, if 100 minutes per day is allocated to reading for a student who pays attention 85 percent of the time, at a high level of success for almost two-thirds of that time, then s/he will experience about 52 minutes of Academic Learning Time per day.

The Learning Student

A student who accumulates large amounts of Academic Learning Time may be characterized as follows. First, the learning student works on an academic task that is designed to result in increased knowledge or skills. The amount of time that the student spends in a given knowledge or skill area is directly and positively related to learning in that area. Furthermore, this appears to be as true for the more conceptual knowledge areas (comprehension) as it is for the more basic skill areas (decoding). Therefore, the learning student spends relatively great amounts of time working on tasks that are directly related to the subject matter to be learned.

The learning student is also very attentive. S/he is actively involved in the task at hand, probably with some enthusiasm. The learning student is busy performing the academic part of the task, rather than sharpening pencils, looking for a book, or waiting in line to ask the teacher a question. S/he is not "socializing" or daydreaming. Nevertheless, the student is enjoying the activity, and paying attention for relatively long periods of time does not upset the student.

The learning student spends a lot of time practicing and reviewing skills. S/he undertakes an activity related to a new skill only after thoroughly learning skills prerequisite to the new skill, so s/he virtually never encounters an activity that is really entirely "new." There is always some need for consolidation of acquired skills (practice), but as the student advances, s/he actually "learns how to learn": it becomes easier to acquire newer skills without so long a period for consolidation of prerequisite skills.

A major conclusion is that this "learning student" is not necessarily an unhappy student. The learning student does not learn to dislike learning. We do not find any evidence that students are less satisfied when the sheer quantity of work (allocated time) is relatively great. Furthermore, we do not find that students who pay more attention (work intensively) acquire a distaste for learning. In fact, there is some indication that high attention is usually the result of interest and enthusiasm, rather than coercion, so high rates of attention represent a more positive attitude toward learning.

It is interesting to note that the high success component of learning is associated with more positive student attitudes. Successful students probably enjoy learning more because of their success. Failure, even when it is only occasional, appears to result in a more negative attitude among elementary school students.

To some extent, the characteristics of the learning student are under the direct control of the teacher. Teachers make decisions about what to teach and how much time to spend on a particular goal. The ALT model implies that these decisions are very important. Teachers should be aware of how much time is really being spent on different skill areas. Classroom time is limited, so teachers should be careful to spend time on those activities that they consider the most important. If some skills are particularly important for students, it would be reasonable to spend large amounts of time on those skills.

The student's success rate is also largely under the direct control of the teacher. As teachers assign tasks to students, they should try to match the task to the student's skill level, thereby providing frequent high success. This strategy is particularly promising at earlier grades and for less advanced students. Note that there have been previous advocates of this approach (programed learning and mastery learning). However, many teachers probably do not recognize the extent to which less advanced students need practice and review.

Effective Teaching

Diagnosis. The data support the conclusion that diagnosis is an important part of effective teaching. Students learn more when teachers know more about what their individual students can and cannot do.

In this study we were primarily interested in cognitive achievement. To foster cognitive achievement, it is important for the teacher to know the cognitive skills and level of performance of individual students. To measure teacher diagnostic skills, we asked teachers to predict how heir students would do on representative items from the BTES test attery. Students learned more when their teachers were more accurate in predicting performance.

Teachers were more accurate in predicting cognitive performance when they knew more about the subject matter and when they attended to differences between students. Teachers who can make accurate diagnoses have established a foundation for instructional planning.

Prescription. Prescription refers to the process of deciding what students may work on in the classroom. It is a complex area to describe and evaluate.

The major positive factor in this area was the "appropriateness" of the instructional program for the needs of the students. This variable represents the integration of the two planning functions, diagnosis and prescription. It assesses the extent to which teachers use their knowledge of individual students to prescribe apparently reasonable instructional programs, matched to the needs of students. Appropriateness was related to success rate and to achievement.

Our measure of appropriateness was a rating made by trained fieldworkers based on interviews and extensive observation. Fieldworkers were asked to consider the pacing of instruction–whether faster students could move ahead while slower students received extra help. They were asked to consider student success rate. They were given a hypothetical example of appropriateness–that the teacher might notice a student's interest in mathematical puzzles and bring in some additional materials that the student might be interested in–and an example of inappropriate instruction–the teacher having all students in the same reading book regardless of clear differences in reading skill.

Fieldworkers were also asked to give the reasons for some of their ratings. The most salient dimension in second-grade classes appeared to be flexibility of grouping. When noting instances of appropriateness, fieldworkers often commented that the teacher would "regroup students according to needs" or that a student who was doing particularly well or particularly poorly was moved to another group. For grade five classes, this same dimension appeared, but fieldworkers also seemed to attend to the overall organizational structure of the class. Individualized programs in grade five tended to be rated relatively high on appropriateness.

The definition of "appropriate" used for the ratings was fairly broad and general. It assesses not whether each student was given the best instruction for his or her needs (something that would be impossible to determine), but instead whether the program appears to be *reasonable* for the different students in the class.

Presentation. Presentation skills appear to be useful for increasing student engagement in mathematics. Teachers tend to explain concepts more often in mathematics than in reading. (The term "explain" is used broadly here; demonstrating the steps involved in an addition problem would be considered explanation.) Students pay attention more in mathematics when they receive more frequent planned presentation of concepts in a group setting. They also pay attention more when the teacher spends time discussing the goals or structure of the lesson and/or giving directions about what the students are to do. Perhaps because of the tendency to give relatively more seatwork in math than in reading and because of the variety of problems to work, it is important that students know both what the context of the lesson is and what they are to do. Then they become more involved in the task.

In both reading and math, students tend to make fewer errors on daily tasks when teachers spend more time structuring the lesson and giving directions. It seems critical that students understand what they are supposed to do so that they can respond correctly. Descriptions of particularly successful classes often mentioned that the teacher had a regular routine of beginning each lesson with a presentation in a group setting. The teacher would tell the students what they were going to work on, make sure all students understood the assignment, and go over examples where appropriate.

One kind of presentation was consistently associated with less high success and more low success: explanation of academic content specifically in response to student need. Students who made more errors and did not understand classroom assignments received more explanation specifically in response to need. In short, students who needed help, got help. Although this seems reasonable, teachers should be wary of overreliance on this technique. Explanation should increase understanding and increase the overall frequency of high success. In our classes, this did not always happen. The danger is that explanation-need is too little, too late. Frequent use of explanation-need might best be interpreted as a symptom that the success level or pacing of instruction is inappropriate for the student. Major changes in the tasks might be in order.

Monitoring. Monitoring is keeping track of student progress on instructional tasks. The major form of monitoring that we observed was teacher questioning in a group setting. Teacher questions account for about one-third of the interactive, substantive instruction that takes place. Students pay attention more when they are more often involved in substantive interaction, and teacher questions are an important part of that process. They involve the students in the interaction and give the teacher information about what the students understand.

The term monitoring can also be used to refer to the teacher behavior of circulating around the room during seatwork, checking on how students are doing. We found that a teacher rarely stops to observe a student's work without making some comment, providing feedback or explanation. When a student receives this kind of attention from an instructor during seatwork, s/he pays attention more. Thus, it is a good idea to monitor seatwork by going around the room giving help or feedback as frequently as possible. Descriptions of high-achieving classes suggest that good teachers do this not only to keep students on task, but also to find out as much as they can about how students are doing so they can plan further instruction.

Feedback. One particularly important teaching activity is providing academic feedback to students (letting them know whether their answers are right or wrong, or giving them the right answer). Academic feedback should be provided as often as possible to students. When more frequent feedback is offered, students pay attention more and learn more. Academic feedback was more strongly and consistently related to achievement than any of the other teaching behaviors.

Academic feedback as defined in the observation system includes many different behaviors. We do not know at this point what types of feedback might be more valuable than others. We can at least suggest some of the possibilities.

As defined in this study, feedback is the major component in group interaction. Much classroom interaction follows a question-and-answer or recitation format: the teacher asks a question; a student answers the question. Presumably, when the teacher asks a question all students are supposed to think of an answer. When some student gives an answer orally, each student gets feedback on his or her internal answer. So, when one student gave an answer aloud, our observers considered it feedback to students listening to the answer. It can also be thought of as a form of "modeling." This kind of feedback within group interaction is an important way to encourage student attention as well as teach content.

Some classes that we observed had a regular routine of meeting as a group to check answers on group assignments. One fifth-grade math class had regular homework assignments and spent the first part of each day going over them. Presumably, students are more likely to complete tasks when they know they will be held accountable.

An oral reading circle was also a situation we defined as involving high levels of feedback. Much like the recitation sequence, oral reading was considered feedback to a student who was reading along silently. The teacher might also correct errors, thus providing feedback to all students. This important purpose for oral reading should be kept in mind.

Noncredentialed instructors such as aides, volunteers, and peers can provide feedback. To plan instruction, choose learning tasks, or explain concepts requires some skill as an instructor, and probably some training. But anyone who knows the answer to a problem can tell a student whether an answer is right or wrong, or give the answer to the student. Since an important part of learning is responding and receiving feedback, all classroom personnel should be used wherever possible to provide feedback.

Feedback can also come from the curriculum materials rather than a human instructor. Programed texts are organized to provide immediate feedback. The curriculum also provides feedback when students check their answers in the back of the book or with an answer key. Feedback from the curriculum was not frequent in our classes, but it could be an important way to increase the amount of feedback students receive.

In addition to academic feedback, we also looked at task engagement feedback–feedback to the student about whether classroom behavior was acceptable or unacceptable. Most of the task engagement feedback we observed turned out to be negative, such as reminders to students to get back to work when they were off task. We found no evidence that frequent use of such reprimands had any positive effect. It may be that some well-timed and well-phrased reminders are useful, but when task engagement feedback becomes frequent it is a sign that some structural changes are needed. There is an important lesson here for teachers who use these findings to increase student engagement: Scolding students more often is not the answer. Instead, one might (1) check to see that tasks are not too hard for the student (task engagement feedback was positively correlated with low success rate), (2) increase the clarity and emphasis with which expectations are stated and the consistency with which students are held accountable, or (3) increase the amount of substantive interactive instruction.

A final comment comes from descriptions of high-achieving classes. These classes tended to have some type of positive reward system. Good work was rewarded. Such rewards were not frequent, but students had some sense, formal or informal, of what they had to do to get them. There seems to be value in reward systems that acknowledge major learning events; they give the student recognition for working and for succeeding.

Context. Schooling has many different purposes. One purpose is cognitive learning. Others might be developing independent work habits, learning social interaction skills, feeling good about oneself, enjoying work, appreciating the fine arts, or keeping students off the street. Most teachers value and work toward a number of different outcomes. Because the study focused primarily on cognitive outcomes, we cannot fully evaluate classroom instruction. Our data do point out, though, that choices must be made and that teachers should be aware of the choices they can and do make.

Two of the general variables in the study described the focus or orientation of the teacher. One was academic orientation–the extent to which the teacher emphasized, valued, and worked toward cognitive achievement. The other was orientation toward affect–the extent to which the teacher was aware of, acknowledged, and valued student feelings.

Examining these variables in relationship to student engagement and student achievement reinforced the old maxim, "first things first." If the teacher's goal is to have every student show substantial growth on basic skills, then it is important that the teacher show his or her commitment to achieving that goal. The teacher must be willing to allocate classroom time to academic instruction and must communicate to the students the belief that academic learning is important. The teacher must be willing to make a personal effort to reach that goal.

Some teachers in our study placed primary emphasis on affective outcomes–music, personal development, and good feeling. Under these conditions, both ALT and achievement were relatively low.

Many teachers give first priority to academic instruction but also consider student feelings and value human development. There were examples in both grades of teachers who made a sincere effort to provide competent academic instruction and also to take into account student interests and human feelings. Often these classes were in the middle range of ALT and of achievement.

Another context variable, "learning environment," needs to be considered. This variable was a composite of two ratings–one on "cooperation," the other on "student responsibility." Especially in grade two, classes higher on learning environment tended to have higher achievement. Both components, cooperation and student responsibility, contributed to this effect. When students worked together to reach academic goals and when they took responsibility for achieving them, achievement was higher. Cooperation and student responsibility in nonacademic pursuits did not have this effect.

An image of a model class could be constructed from these results: there is a clear focus on cognitive learning; the students expect to work and are held responsible for doing so; the teacher cares about the students and wants to help them learn; teacher and students interact comfortably and frequently on work activities. In other words, it is a class where the teacher emphasizes the belief that the purpose of school is learning and fosters an environment where everyone, teacher and students, works together to reach that goal.

Use of the ALT Model

Teaching is a complex process. The ALT model tries to deal with the reality of teaching. It is therefore a complex model. It is intended to provide a coherent, general framework for analyzing and describing the teaching-learning process. We think this makes the model widely applicable to many approaches to elementary school teaching.

It would be appropriate to use the model as a basis for observing, analyzing, and discussing ways to teach. Teachers and prospective teachers might benefit from a chance to examine the concepts in the ALT model and to use them for systematic observation in a variety of classes. A chance to watch the learning student would be particularly valuable, since teachers lose sight of the individual student learning process when they must manage an entire class. If different instructional approaches were observed, teachers could analyze the different ways in which the five teaching functions of the model were (or were not) fulfilled.

Teachers studying the ALT model would have to understand it as a framework both for student and teacher behaviors. Academic Learning Time provides the student behavior framework. Since Academic Learning Time occurs simultaneously with instruction itself, it provides an individual student variable for assessing the impact of instruction. Therefore, Academic Learning Time is of potentially great value as an information tool to be used by teachers in the evaluation of their daily instruction. An awareness of the Academic Learning Time for an individual student, or the profile of Academic Learning Time across students in a class, may help a teacher decide when to intervene in an instructional sequence and what to change. This framework provides an observable in-class criterion that can even guide minute-to-minute instructional decisions.

The ALT framework for teacher behaviors categorizes these behaviors in terms of the general functions they serve in instruction. When specific teaching behaviors are analyzed at a molecular level, the impact of each behavior is unstable over even relatively small changes in context. The same behavior may serve different functions, and different behaviors may serve the same function, depending on the context. This implies that there is no one specific behavior that will be essential to the performance of any given function.

This functional view of teaching behavior has considerable implication for the practice of teaching. Certainly teachers need a repertoire of specific teaching behaviors, but they must also have a good grasp of the functions that specific behaviors fulfill in a given context. Teachers who are aware of teaching functions will be able to conceptualize their classroom behavior in terms of this more general framework. They will be able to evaluate what they are doing in terms of instructional functions that should be served. Furthermore, they will be able to recognize what they are not doing, in terms of functions that are not served by any of their usual behaviors. Hence, where Academic Learning Time provides a basis for determining when students are or are not learning, the five teaching functions provide a basis for analyzing the strengths and weaknesses of the instructional process.

Teaching as Management: Seeking a Workable and Dynamic Balance

To apply the BTES model to typical classroom instruction, a broad view of teaching is needed, one that emphasizes the teacher's role as a manager of instruction. Furthermore, it must be recognized that this management role varies enormously as a function of the instructional situation. That is, to teach one student something, a teacher can learn about that student in depth, work directly with the student on relevant tasks, model desired behavior, give constant feedback, and provide timely and appropriate explanation. With a class of 30 students, however, this kind of one-to-one teaching is an infrequent luxury. Instead, the teacher must try to plan generally reasonable activities for the different students in the class and keep everything moving along as well as possible. The teacher cannot consider each student in isolation but must manage instruction for all students simultaneously. A dynamic balance between individual and group needs is required.

The ALT model can be thought of in terms of two competing goals: student engagement and student high success. The data show that student engagement rates are higher when students have more contact with an instructor. Increasing the number of teaching personnel (aides, volunteers, peer tutors, etc.) is a good way to increase the amount of interactive instruction a child receives. If the number of personnel (per pupil) is fixed, the amount of interaction can only be increased through increasing the amount of group instruction. At the extreme, this means whole class instruction, which has the advantage of efficiency and ease of classroom behavior management. The teacher can give directions to everyone at once, keep an eye on what students are doing, monitor academic performance more easily, and give group feedback. This usually results in increased student engagement.

The problem with large group instruction is that the same task is seldom appropriate for all students in the class, at least not for very long. The findings for student rate of high success, and related findings on diagnosis and prescription, show the importance of matching tasks to individual student needs. Especially when students are low in entering knowledge or school learning skills, it is important for them to have enough successful practice time to master the material. This means that the instructional program must, to some extent, provide different tasks for different students and allow different amounts of practice. "Individualized" programs emphasize the goal of appropriate instructional content and pacing for each individual. In the extreme, each student might be working on a different task at any point in time. Therefore, the teacher cannot give directions or feedback efficiently in person; these functions are usually built into the curriculum system. Some students may react to these independent seatwork settings and the lack of interactive contact by being less attentive.

Probably, for most classes and most teachers in the elementary grades, it will not be suitable to use one organizational pattern for the entire day. That is, constant whole class instruction will probably not provide sufficiently appropriate content for all students. On the other hand, constant independent seatwork in individualized programs will probably be too difficult to manage efficiently while maintaining engagement. Small group work is a useful compromise for individualizing content in a reasonable way, maintaining efficiency and engagement, and providing social experience. Even here, the same students will probably not fit in the same groups for all instructional content. Furthermore, it will not be possible for all students to spend all of their time working in groups. The teacher must devise some workable system using different settings (groupwork-seatwork) for different students in different content areas at different times during the day, and keep the whole system adaptable to changes in student needs during the year.

In sum, the teacher must try to balance conflicting goals, taking into account the needs of the class as a whole, as well as the needs of individual students. There is not one "right" way to organize the instructional program. Different approaches have different assets and liabilities. By keeping in mind the joint goal of student attention and high student success, the teacher can evaluate the current organizational structure and adapt it over time.

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Time and School Learning

Walter R. Borg

Perhaps the most important contribution of the Beginning Teacher Evaluation Study is the development of the concept of Academic Learning Time and the study of its relationship to other important educational variables.

The BTES notion of Academic Learning Time was influenced by the theoretical work of Carroll (1963), Bloom (1976), and Wiley and Harnischfeger (1974), but it represents an advancement over these earlier theories. BTES findings on allocated time and engaged time, although derived from a stronger and more sophisticated data base, are substantially in agreement with earlier research. The BTES provides the first evidence on the relationship between achievement and ALT, the simultaneous occurrence of allocated time, engaged time, and high success rate.

This chapter provides a summary of the work of Carroll, Bloom, and Wiley and Harnischfeger, which has led to increased interest in time as a variable in school learning. Next, findings on allocated time and engaged time from the BTES and from previous research are compared. Finally, it presents BTES findings on ALT.

Theoretical Work Relating Time to School Learning

Over a century ago, educators recognized the importance of time to learning in the schools and carried out many descriptive studies designed to determine how school time was being allocated to different subjects and how time allocations varied from school to school. Concern for ways to make more efficient use of school time has also been widespread among educators for at least 60 years. A report by Thompson (1915) documented the fact that there was much interest in the topic of more efficient use of school time around the turn of the century. Thompson reviewed programs that attempted to make better use of school time. Many were essentially

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administrative, such as regrouping of the school years to include junior high school, modification of grading and promotion practices, and rearrangement and elimination of subject matter. Some programs provided extra work time for weaker pupils in afterschool classes, special classes, and summer schools, anticipating Bloom's emphasis on extra learning time and teacher help in mastery programs. Other strategies included changes in instructional procedures, such as assignments with the degree of difficulty adjusted to the age and experience of the child. This attention to the difficulty of assignments anticipated an important element in the BTES model.

Finally, Thompson discussed various experimental programs in teacher education and stated, "Teacher-training institutions are seriously, and as never before, considering just what goes into the make-up of the successful teacher" (page 33). He pointed out that many educators of his period considered the teacher to be the key to efficient use of school time. Thompson listed the following means of achieving more efficient use of time and more effective pupil learning: "(1) better 'condition' of pupils; (2) more definite, attractive, and immediate, as well as distant, goals; (3) a course of study more pertinent in content and more psychological in sequence; (4) wiser, more tactful, and more human teachers; (5) a student-body more devoted and industrious as well as cheerful; (6) a complete elimination or minimization of distractions; (7) more timely beginnings in all activities; (8) more industrious prosecution of work; (9) keener competition of the pupil, with himself and with others; (10) saner refreshment and reanimation of pupils" (pages 35-36). Thompson's list was in some ways surprisingly modern, anticipating some of the later theoretical work such as Ginott (1972) and Gordon (1970), as well as including such modern concepts as framing objectives, increasing relevance, and reducing transition time.

The Carroll Model

Carroll's article (1963) on a model of school learning is one of the earliest formulations that fits engaged time into a model for cognitive learning in the school setting. He points out that the time needed for a given pupil to learn a given concept seems to relate to five factors. These are:

1. Aptitude–the amount of time an individual needs to learn a given task under optimal instructional conditions.

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2. Ability–to understand instruction.
3. Perseverance–the amount of time the individual is willing to engage actively in learning.
4. Opportunity to learn–the time allowed for learning.
5. Quality of instruction–the degree to which instruction is presented so as not to require additional time for mastery beyond that required by the aptitude of the learner.

Carroll reduces these five variables into the formula:

$$\text{Degree of Learning} = f\left(\frac{\text{time actually spent}}{\text{time needed}}\right)$$

He discusses the difference between opportunity to learn, which is the time the teacher or school system allocates to a given learning task, and engaged time, the time a given pupil is actively involved in learning related to the task. Carroll also points out that it would be desirable to determine the interactions of the five variables in the model. The two variables that are external to the learner, opportunity to learn and quality of instruction, seem to offer the most promise for experimental manipulation. Of these, opportunity to learn is a much more clear-cut and easily understood variable than quality of instruction, which Carroll acknowledges to be "elusive." Unfortunately, it is nearly as elusive today as it was 15 years ago when Carroll's article was published, although both Bloom (1976) and the BTES translate the concept into a number of specific elements.

Carroll also includes the idea of task difficulty in his model. He points out that the overachiever, having greater perseverance, masters more of the easy tasks, tasks within the range of his aptitude, than does a student of average perseverance.

In discussing future research, Carroll mentions the desirability of attempting to provide a general way of measuring opportunity to learn, which he defines as the actual time available to individual students to learn in view of the pacing of instruction. Later in this chapter we will see that this research need, discussed by Carroll 15 years ago, has been better met by the BTES than by any previous research located by this author.

There is some research to support parts of the Carroll model. For example, a study by Hymel and Gaines (1977) was designed to test the various elements in the Carroll model. The authors defined quality of instruction in terms of the use of mastery learning strategy and found that a randomly assigned mastery learning group exceeded the control group in achievement at the .001 level. Carroll (1974) has also done some work to test his model against research data.

The Bloom Model

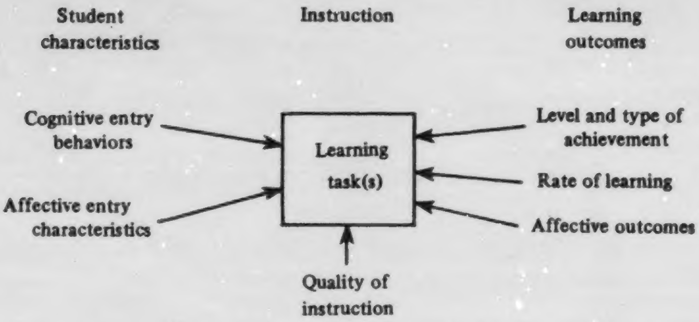
To a great extent, Bloom's model of school learning builds on Carroll's ideas, and from these ideas he has built a more complete and specific model. Bloom and his students have also conducted a substantial research program and have carefully fitted the research of others into an element-by-element test of the Bloom model (Bloom, 1976).

Bloom (1974) cites several international studies to illustrate that measures of time in school, of themselves, provide only a rough indicator of student achievement. Using achievement in the highest achieving developed nations as base, an average student in a developing nation has obtained about 6 years of learning in 12 years of schooling, and an average student in a low-scoring developed nation has attained 8 years of learning in 12 years. In studies published in the mid-1950's (Bloom, 1956; Bloom and Statler, 1957), Bloom compared the achievement of students in 48 States at the end of 12 years of schooling. When we use the mean 12th-year achievement of students in the highest scoring State as a base, the average student in the lowest scoring State completes only 8 years of education in 12 years of schooling. The view that allocated time is not highly related to achievement is supported by many of the studies of time allocated to school subjects, which have usually found low correlation between this variable and achievement (Rosenshine, 1978).

Even though allocated time is not highly related to achievement, Bloom believes that more refined measures of learning time are of major importance. By establishing time as the central variable in school learning, Bloom believes that Carroll produced a major shift in our thinking about education. Although time has been a central variable in laboratory studies of human learning for the past century, it has only recently become an important variable in school-based studies of learning.

In discussing mastery learning, Bloom emphasizes that simple allocations of the same amount of time to each pupil will not bring about mastery of the learned content for many pupils. Data developed by Glaser (1968) and Atkinson (1968) suggest that the slowest 5 percent of learners take about 5 times as long to reach any given criterion of mastery as do the fastest 5 percent of learners. However, Bloom states that where time and help are provided to slower students, and these students are motivated to use the time and help available, 90 percent or more finally reach the learning criteria set in mastery learning studies. A number of studies of mastery learning (Block, 1971; Peterson, 1972) provide evidence that mastery learning procedures typically bring about 80 percent of students to a learning criterion usually attained by only about 20 percent. This additional learning is achieved at a cost of 10 to 20 percent additional learning time.

Figure 2.1. Major Variables in Bloom's Theory of School Learning


Student characteristics
Instruction
Learning outcomes
Cognitive entry behaviors
Affective entry characteristics
Learning task(s)
Quality of instruction
Level and type of achievement
Rate of learning
Affective outcomes

Source: Reproduced with permission of the publisher from B.S. Bloom, *Human Characteristics and School Learning.* © McGraw-Hill, 1976.

In Bloom's school learning model (1974, 1976), there are three major factors that influence achievement and on-task time. The first two are cognitive entry behaviors and affective entry characteristics, the previous learning, motivation, and interest a student brings to the task.

The third variable, quality of instruction, is the degree to which the process employed by the teacher in the original instruction, feedback, and corrective measures is appropriate to the needs of the learner. In developing an operational definition of quality of instruction, Bloom (1976) emphasizes four major elements. These are:

1. Cues–instruction to the learner as to what is to be learned and what he is to do in the learning process. From his review of relevent research, Bloom estimates that quality of cues accounts for about 14 percent of the variance in achievement.
2. Reinforcement[1]–based on the studies dealing with group reinforcement in the classroom, Bloom estimates that reinforcement accounts for about 6 percent of achievement variance. This is probably an underestimate. He emphasizes the need for studies relating reinforcement of individuals to their achievement.
3. Participation–active participation in the learning situation is essential to learning. Bloom concludes from his summary of about 20 studies that approximately 20 percent of the individual student's variance in achievement is accounted for by his participation in the classroom learning process.

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[1] Reinforcement refers to instructional behavior that tends to increase learner behavior related to achievement, such as teacher attention and praise.

4. Feedback/correctives–feedback provides the learner specific information on his progress; correctives usually take the form of alternative cues and additional time and practice. In his review of relevant research, Bloom reports a median correlation between achievement and use of regular feedback and corrective procedures of about .47.

Bloom estimates that the combined effect of the four variables he includes in quality of instruction probably account for 25 to 40 percent of achievement variance, and possibly more. He emphasizes the importance of participation, which is essentially synonymous with engaged time as used in the BTES.

A schematic representation of Bloom's model (Bloom, 1976) shows how the variables cognitive entry behaviors, affective entry characteristics, and quality of instruction relate to learning outcomes (figure 2.1). Bloom reports that multiple correlations between achievement and the three variables are typically .85 or higher when corrected for attenuation. He finds that correlations between these three variables and time on task are about .75 when corrected for attenuation.

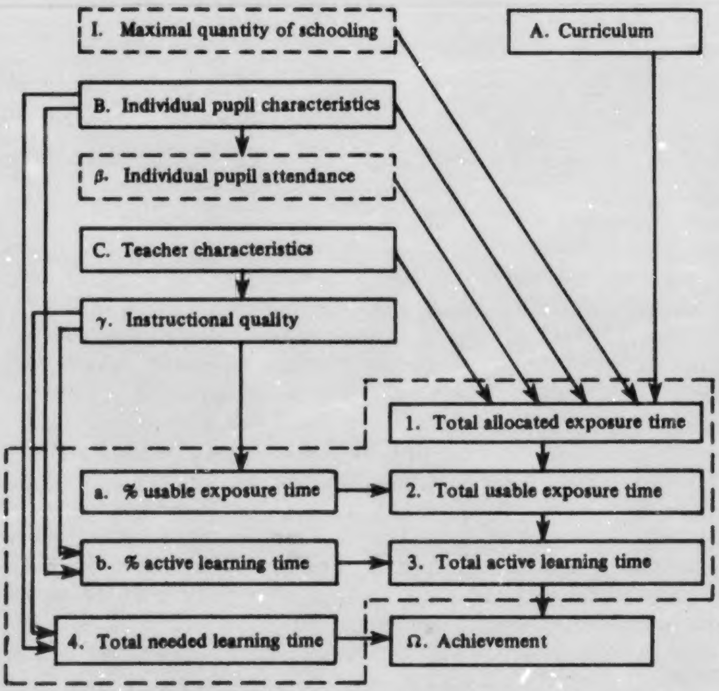
The Wiley-Harnischfeger Model

Among the most useful theoretical formulations concerned with school learning since Carroll's 1963 model is the work of Wiley and Harnischfeger (1974, 1976). Like other researchers who have worked in this field, the authors point out the futility of using standardized achievement tests as a criterion in the face of increasing evidence that there are tremendous differences in the curriculums covered in different classrooms and in the amount of time devoted to various aspects of the curriculum. Like Carroll and Bloom, they consider time to be the concept that is basic to the construction of their model for the teaching-learning process.

In the Wiley-Harnischfeger (W-H) model, as in Carroll's formulation, pupil achievement is directly determined by only two variables: the total time needed by a given pupil to learn a task and the total time the pupil actually spends on this task. The influence of all other variables such as pupil characteristics, instructional quality, and teacher characteristics is mediated through these two basic time factors. There are enormous variations in the total allocated time, the learning time needed by different pupils, and the amounts of allocated time actively spent in learning. There is also a great difference between the amount of time nominally allocated to schooling and the active learning time for a given pupil. Allocated time is reduced by a great many variables ranging all the way from such infrequent events as parent boycotts or teacher strikes to such day-to-day occurrences as pupil motivation. Such variables as pupil aptitude, clarity of teacher instructions, and difficulty level of the assigned task are also considered in the model.

Figure 2.2 illustrates the W-H model and shows how pupil and teacher variables influence needed learning time and active learning time. It can be seen that the W-H theoretical model moves well beyond the variables of average daily attendance, length of school day, and length of school year, which Wiley had explored in his reanalysis of the Coleman report data

Figure 2.2. Individual Instructional Exposure and Achievement


I. Maximal quantity of schooling
A. Curriculum
B. Individual pupil characteristics
β. Individual pupil attendance
C. Teacher characteristics
γ. Instructional quality
1. Total allocated exposure time
a. % usable exposure time
2. Total usable exposure time
b. % active learning time
3. Total active learning time
4. Total needed learning time
Ω. Achievement

Source: Reproduced with permission from D.E. Wiley and A. Harnischfeger, Explosion of a myth: Quality of schooling and exposure to instruction, major educational vehicles. *Educational Researcher* 3:4 (April 1974): 7-12. © 1974, American Educational Research Association, Washington, D.C.

(Wiley, 1973), and which will be discussed here in a later section. It is on this more sophisticated analysis of needed learning time and active learning time that the BTES concept for academic learning time was built.

In elaborating their model, Wiley and Harnischfeger (1976) discuss a number of factors that can influence the total active learning time for a given pupil. Among these broad factors are teacher planning and preparation, the nature of the learning settings, and teacher capabilities. They view teacher capabilities in the context of four major categories. The first is planning, which involves forming detailed specifications and guidelines for classroom activities. The second, implementation, is concerned with the teacher's capacity to translate plans into classroom strategies and activities. Inducing refers to the ability of the teacher to motivate pupils and increase their active learning and task involvement. Finally, the teacher needs communication skills to facilitate pupil learning.

They also expand the concept of Teacher Characteristics (figure 2.2) to include "motivatings," "monitorings," "communicating," and "design, pace, and sequence of learning." Curriculum (figure 2.2) is called "learning settings" in their later work and is broken into "curriculums," "grouping strategies," "kind of teacher supervision," and "teacher managerial activities."

A study by Kidder and his colleagues (1975), carried out concurrently with some of Wiley and Harnischfeger's work, provides data on some of the variables included in the W-H model. The sample consisted of approximately 2,500 pupils in the fourth, fifth, and sixth grades in four school districts. The quantity of instruction in the study was estimated from interviews with teachers, aides, and other persons involved directly with the pupils. Quality of instruction, which is considered in all three of the learning models we have discussed, was also measured. However, the measures of quality of instruction were somewhat limited, consisting mainly of information on the materials utilized in the reading instruction, on the instructional mode, and on the type of instructional staff. Most of these data were collected through interviews. At best, this must be regarded as a limited basis for estimating quality of instruction. Although some significant correlations were obtained between time variables, such as minutes per year the teacher spent in whole group instruction and minutes of individual help by the teacher, correlations were generally below .30 and were not consistent from district to district. However, multiple correlations using pupil ability, teacher and school characteristics, and time variables to predict pupil achievement ranged from .87 to .90 for the four districts, with time variables making significant contributions to the multiple correlation in three districts. This study may be regarded as providing limited support for the W-H model, although the methods for estimating both quantity and quality of instruction were weak.

The Academic Learning Time Model of Classroom Instruction[2]

The BTES investigators began by examining the amount of time available during school for a student to work in a particular subject area. This is, of course, the old concept of allocated time with the teacher doing the allocation in this study. Engaged time, which had been explored in previous work, was also part of the foundation upon which the investigators built. From these beginnings, the concept of learning time developed. Academic Learning Time (ALT) is time spent by a student engaged in a task on which few errors are made and where the task is directly relevant to an academic outcome. Thus, the basic components of ALT are allocated time, student engagement, success rate, and task relevance to an academic outcome.

Let us briefly review each of these components. Allocated time is the time designated by the teacher for a particular learning task. Engaged time is the time that the student is actually involved in the given learning activity. Success rate is designed to reflect the degree to which the student correctly processes and understands the learning task. High success rate refers to situations where the student has a good understanding of the task and makes only occasional careless errors. Low success rate describes the situation where the student does not understand the task and makes correct responses at about the chance level. Medium success rate involves a partial knowledge of the situation where the student understands enough to produce some correct responses but also commits errors due to limitations and his understanding.

Originally, the ALT model hypothesized that medium success rate would be associated with maximum learning. However, preliminary data analysis indicated that high success rate was positively related to achievement gain while medium success rate was not. Therefore, the definition of ALT was altered to refer to time students spend learning tasks at a high success rate rather than at a medium success rate. The investigators hypothesized that a low success rate would always be detrimental to learning.

Task relevance refers to the obvious fact that if student achievement is to be employed as a criterion, the learning activities must be limited to those content categories that are covered on the achievement measure.

In addition to the components of Academic Learning Time, the investigators hypothesized an instructional process they believe will result in increases in ALT. This process includes diagnosis, prescription, presentation, monitoring and feedback. Some of the instructional functions such as monitoring and feedback are closely related to concepts discussed in earlier models such as Bloom's. Classroom environment, including such dimensions as enthusiasm, warmth, cooperation, and task orientation are also considered in the BTES as potential factors influencing ALT.

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[2] The term "model" is used here to mean a scheme for viewing instruction. It should not be assumed that the BTES provides a description of a "model teacher" or a "model classroom."

When we examine the three models of school learning that preceded the Beginning Teacher Evaluation Study, we can see that each has contributed important ideas to the ALT model. However, the ALT model goes beyond any of its predecessors in specifying the variables that influence school achievement. A major advantage of the ALT model as compared with learning models such as those proposed by Wiley and Harnischfeger, Carroll, and Bloom is that each component in the ALT model is concrete and quantifiable. In contrast, a variable such as "quality of instruction," which is incorporated into all three previous models, is complex and difficult to define operationally. Although partial definitions of quality of instruction can be developed, we have probably identified very few of the critical variables that determine instructional effectiveness.

Perhaps an even more important contribution, however, than the theoretical development of the ALT model is the process employed to validate the model in actual classrooms. Some evidence has been accumulated over the years to support the Wiley-Harnischfeger, Carroll, and Bloom models of school learning, but none of these models has been tested by research of the scope and magnitude of the Beginning Teacher Evaluation Study. The BTES investigators systematically developed and carried out a research program designed to test every element in their theoretical model. The result of this research is 14 major findings that support virtually every element in the ALT model of school learning. Three of these findings are directly concerned with time as it relates to academic achievement; they deal with allocated time, engaged time, and academic learning time. In the remainder of this chapter, we will review previous research for each of these major time variables and will relate this work to the findings of the BTES project. We will see that in each of these areas the BTES investigators have gathered evidence to support their instructional model and advance our understanding of the function of time in school learning.

Research on Allocated Time

Early Studies of Allocated Time

Of the time concepts that eventually became part of ALT, allocated time was the first that was explored by educational researchers. Early studies of allocated time collected descriptive data on the time devoted to different subject areas by different school districts. Mann (1928) searched school records dating back to 1828 and in 1926, conducted a survey of time allocations in 444 American cities. The first specific time requirements reported by Mann were found in reports concerning the public schools of Boston in 1845. The first complete time allocation by subject found by Mann was printed in the report of the Cleveland, Ohio, Board of Education for the year 1855-56.

Mann was able to locate allocated time reports for six cities from 1862 to 1972 (table 2.1). Comparable data from six cities were gathered by Payne in 1904.

A study by Holmes (1915) was the most comprehensive survey of time allocations in public elementary schools prior to Mann's survey (table 2.1). This report deals with the distribution of time by subject matter and grades in the elementary schools of 50 American cities representing all sections of the United States. Holmes cautions that official tables of allotted time do not represent the actual distribution of time in any classroom. He states: "Eventually our standards must be based on the study of time actually consumed; but even then we shall have to allow for obstacles and interruptions . . ." (p. 22). Thus, Holmes clearly distinguishes between allocated time and engaged time—a distinction given much attention in the models of school learning we have reviewed.

It is interesting to note that Holmes considered the outstanding finding of his survey to be the great divergence in time allocation among the elementary school subjects. This tremendous variability in allocated time has emerged in every study in this field over the past 60 years. If anything, the variability found in the BTES analysis is even greater than reported by previous investigators, suggesting that huge variation in allocated time is a fairly permanent fact of life in American public elementary schools. We will see that Wiley's (1973) analysis makes this variability an extremely important factor in understanding achievement differences.

A precise comparison of time allocations between the BTES study and earlier studies such as those by Payne (1904), Mann (1926), and Holmes (1915) is not possible. However, the authors of all of these studies define their categories closely enough so the data in table 2.1 provide what we believe to be a fairly accurate comparison. Definitions for "reading and language arts," "mathematics" and "other academics" appear to be very similar. However, some difficulty arises in comparing data in the "nonacademic" and "break" categories. The BTES lists structured physical education as "nonacademic" and unstructured physical education as "break" time. A precise division is not possible with the earlier data, although the definition of physical education in the Mann survey definitely refers to structured activity and has been classified as "nonacademic" time. Least

Table 2.1. Time Allocations in Minutes per Day Across the Decades

Study	Subject areas											
	Grade 2						Grade 5					
	1*	2	3	4	5	6	1	2	3	4	5	6
1862-72 data for 6 cities (Mann)	143	50	33	39	23	16	146	61	40	35	24	18
1904 survey of 6 cities (Payne)	157	41	15	44	23	7	119	53	60	41	21	7
1914 survey of 50 cities (Holmes)	136	30	24	83	38	12	109	45	63	69	34	10
1926 survey of 444 cities (Mann)	137	29	19	69	22	11	108	43	59	73	19	10
BTES A-B period	85	37	9	54	76	45	113	41	25	52	80	46
BTES B-C period	88	36	8	55	75	44	110	44	17	65	77	47

*Subject Areas: Data from earlier studies have been organized to fit BTES categories as much as possible.

1. Reading and language arts. In the earlier studies this typically includes reading, language, spelling, and penmanship.
2. Mathematics.
3. Other academics. In earlier studies this includes geography, history, and science.
4. Nonacademic. Includes such activities as music, art, structured physical education.
5. Break. Includes recess and unstructured physical education (also includes lunch period in BTES study).
6. Management, wait, and transition. Includes opening exercises in the earlier studies.

comparable with earlier research is the BTES category, which includes management, wait time, and transitions. The only similar category in the earlier studies is "opening exercises," largely a management activity similar to today's homeroom period. With these limitations in mind, perhaps the most impressive difference in second grade time allocations between the early studies and 1976-79 BTES data is that, in the early studies, more time was devoted to reading and language arts and "other academic subjects" and less time was scheduled for breaks. Grade five time allocations for reading and language arts and mathematics are closely comparable between the two periods. Again, "other academic subjects" were allocated much more time and "breaks" much less time in the schools during the 1900-26 period.

The variability in allocated time is very large for all studies we have located. However, these figures are not entirely comparable since in the BTES the variability is measured from classroom to classroom, while in the earlier studies variability was measured from school district to school district. In Holmes' study, reading, language arts, and arithmetic took up about 70 percent of time spent strictly in classwork. He also found that the amount of time allocated to these subjects was more variable than for any other subjects in the curriculum. For example, in grade two, there was a range of 120 to 374 hours in the time allocated to second-grade reading and 33 to 190 hours in time allocated to second-grade arithmetic.

Mann's survey (1928) found the same huge variations in time allocation that have been reported in every study we have located in this area. For example, he found that the school system giving the greatest emphasis to reading allocated nearly 12 times as much time to that subject as the school system giving the least emphasis. This ratio was even larger for some other academic subjects. For example, spelling was allocated 48 times as much time in the district giving it the most emphasis as in the district giving it the least. The ratio was 109 for literature, and 144 for nature study and elementary science. Even in arithmetic, where the curriculum has typically been more standardized, some school systems gave 4.4 times as much time to this subject as others. As large as some of these differences are, when we remember that Mann's data were based on school district time allocations, we can be certain that the variations among individual classrooms would be even greater.

At the time of Mann's study, some research had already been done to determine the optimum time per day to be allotted to penmanship and spelling. Little research was available at that time on optimum times to be allocated to other subject areas. In a statement that seems surprisingly up to date, Mann concludes:

> Optimum time allotments can be established only after educational research has resulted in:
>
> 1. The determination on the part of curriculum makers of a definite list of specific objectives and desirable outcomes for each subject which should be attained by pupils of the elementary grades.
> 2. The determination of the quantity, quality, and kind of educational experiences necessary to insure achievement of the specific objectives.
> 3. The determination of the most effective methods of instruction to be employed in presenting these educational experiences in order to secure the expected knowledge, skills, attitudes, and ideals (p. 150).

Allocated Time and Achievement

The Wiley-Harnischfeger model for school learning had its beginning with Wiley's reanalysis of some of the data from the Coleman report, *Equality of Educational Opportunity*. This major study of the effects of schooling was carried out by Coleman and his associates in 1966. Although Coleman gathered data on school attendance, he did not analyze relationships between attendance and achievement. Wiley (1973) explored a number of specific deficiencies in Coleman's original analysis and in the reanalysis of the data carried out by Jencks and his colleagues (1972). Wiley then went on to reanalyze data obtained from the Detroit metropolitan area sixth-grade sample of Coleman's *Equality of Educational Opportunity* survey, focusing on quantity of schooling and measures of verbal ability, reading comprehension, and mathematics achievement. Based on the Coleman data, Wiley predicted the effects of various changes in quantity of schooling on the three aforementioned variables. He predicted that increasing the number of days in the school year by 5.5 percent would lead to achievement increases ranging from 8.33 to 16.42 percent. Increasing the hours of the school day from 5 to 5.5 or from 5.5 to 6 similarly would lead to substantial percentage increases in the three achievement measures. Finally, increasing the average attendance from 88 percent to 95 percent would bring about gains ranging from 11.75 to 23 percent on the achievement variable. The overall effect of raising the days of the school year by 10 days, the hours in the school day to 6, and the ADA to 95 percent would be to bring about a 24.34 percent increase in the quantity of schooling. It will be noted, however, that this increase is predicted to lead to an increase of 33.58 percent in verbal ability, 65.5 percent in reading comprehension, and 33.92 percent in mathematics achievement. When we consider that these rough estimates of quantity of schooling do not consider many of the more subtle variables such as quality of teaching, the actual time pupils are engaged in the study of specific subjects, and the amount of wait time and transition time in the classroom, these predicted achievement gains are impressive. Wiley's results present a very strong case to support his contention that quantity of schooling is an extremely powerful variable in determining pupil achievement.

It is important to note that in every case the gain in achievement exceeds the increase in quantity of schooling. It should be remembered that these figures are predictions based on the Detroit data and do not actually reflect changes that occurred in achievement when the changes in quantity of schooling were made.

Wiley points out that a number of questions regarding his analysis need further explanation. He questions whether it is reasonable to expect that a 24 percent increase in the quantity of schooling should result in a 65 percent gain in reading comprehension. He mentions that the analysis could have been ineffective in controlling for pupil background. It is also possible that the quantity of schooling in a given school could be stable over years and, therefore, the analysis could reflect the impact of more than 1 year on pupil achievement. Wiley has followed up his reanalysis of Coleman data with additional comparisons that tend to support the importance of quantity of schooling to achievement.

Wiley calculated the average number of hours of schooling for pupils in schools in his Detroit sample by multiplying average daily attendance by the number of hours in the school day and by the number of days in the school year. He found that schooling ranged from 710 to 1,150 hours—a tremendous difference when we consider that all schools were drawn from the same district.

It should be noted that when Karweit (1976) carried out analyses similar to Wiley's on several data sets, including data from the Coleman study, she failed to find the large relationships between quantity of schooling and achievement that came out of the Wiley analysis. Her results generally showed positive, but smaller, relationships than those reported by Wiley. However, part of her work used pupil attendance to estimate quantity of schooling, a measure that provides a much weaker estimate than that used by Wiley. As Harnischfeger and Wiley (1977) point out, replications are needed to determine how large an effect quantity of schooling has on achievement. There can hardly be any doubt, however, that a significant effect is present.

Certainly a major contribution of the work of Wiley and Harnischfeger and other researchers in this area is to correct the false conclusion that many have drawn from Coleman's *Equality of Educational Opportunity* report—that schooling has no effect on student learning. A further contribution has been to alert educational researchers to the importance of time in school learning. As Bloom (1973), Rosenshine (1978), and Wiley (1973) have pointed out, most major studies of school learning have not included measures of student learning time as a variable.

Another recent study of allocated time and achievement supports Wiley's findings. Nieman and Gastright (1975) gathered longitudinal data on relationships between test scores and the amount of time students participate in preschool and kindergarten classes. The study was concerned with four groups of pupils: (1) those who had preschool only (about 600 hours of class time), (2) those who had half-day kindergarten (600 hours), (3) those who had all-day kindergarten (1,200 hours), and (4) those who had all-day kindergarten plus preschool (1,800 hours). The results indicated that children who attended preschool scored significantly higher on achievement measures than those who did not attend. Differences between all-day kindergarten versus half-day kindergarten were significant at the .001 level on one of the achievement tests used. Children who had had all-day kindergarten plus preschool were significantly higher at the .01 level than children with all-day kindergarten without preschool. Lack of good research design plus the fact that most of the significant results were obtained for only one of the several achievement tests used indicate these data only provide tentative support for the conclusion that quantity of schooling is significantly related to achievement. The fact, however, that these achievement differences were found across a wide range of different classrooms and methodologies is significant. The number of pupils involved was large, ranging from 130 to 551 for the four groups. The data were consistently in the hypothesized direction for all achievement measures, even though results for some measures were not significant.

Schmidt (1978) conducted a recent study designed to determine the effect that quantity of schooling during high school has on student achievement in six subject matter areas. His data were drawn from the National Longitudinal Study of the High School Class of 1972 and included 9,192 students from 725 schools. Potential hours of instruction were determined for each student in each subject area by multiplying the number of courses by the number of weeks of instruction per course by the length of the class period. Regression analyses were conducted, with the individual student as the unit of analysis, using each of three achievement tests as a criterion.

For the vocabulary achievement test the regression coefficients were significant for potential learning time in all six subjects, but highest in science and foreign language classes. The multiple correlation of measures of pupil ability, background, and potential learning time with vocabulary achievement was .286.

For reading achievement, coefficients for all measures of potential learning time except social studies were significant, with the coefficients again highest in science and foreign language. The multiple correlation of reading achievement with the time, ability, and pupil background variables was .368.

The mathematics regression analysis indicated that of the three achievement areas, mathematics is most strongly influenced by potential quantity of schooling. Regression coefficients for potential learning time in science, foreign language, and mathematics were all large and statistically significant. The multiple correlation for learning time, ability, and background variables versus mathematics achievement was .572. The results of Schmidt's work demonstrate that the quantity of schooling a student receives in high school does have a significant effect on academic achievement.

As one might expect, allocated time is not as powerful a variable as engaged time, and some of the research using allocated time, such as the work of Welch and Bridgham (1968) and Guthrie, Martuza, and Siefert (1976) has failed to find significant relationships with achievement.

The BTES Findings on Allocated Time

Let us now review the findings of the BTES study with regard to relationships between allocated time and achievement. The investigators concluded that *the amount of time that teachers allocate to instruction in a particular content area is positively related to achievement in that content area.* The BTES study differs from previous research on allocated time in several important ways. First, rather than collecting information on broad content areas such as reading and mathematics, the researchers gathered detailed information on highly specific topics within each content area. For example, in second-grade reading, data were collected on time allocated to 26 specific content tasks such as decoding short vowels, compound words, and oral reading. Second, data were gathered from both teacher logs and observer records. In contrast, most earlier research relied on school or district records or on teacher recall only, and often required long-term recall, which is likely to be unreliable. Third, the data were collected for two time periods, October through December (A-B), and January through April (B-C), thus providing some of the advantages of a replication of the study. Fourth, data were collected over a relatively long time–6 weeks during the A-B period and 17 weeks during the B-C period of the study. Finally, teacher log data were recorded daily by each teacher on each of that teacher's six target students. Obviously individual pupil data are much more precise than allocated time data collected for entire schools or classrooms, as has been the case with most of the earlier studies. It is clear that the BTES data are by far the most detailed and comprehensive information ever collected on the relationship between allocated time and achievement.

Table 2.2 presents the results of analyses of allocated time and engagement rate in reading and mathematics at grades two and five during the January through April (B-C) period. Regression analyses of allocated time and student engagement rates as separate variables involved predicting postachievement from preachievement, allocated time, and percent of time student was engaged in relevant academic work. The proportion of residual variance in the postachievement measure that was accounted for by allocated time is reported for each content category. Residual variance can be thought of as a rough estimate of student "learning," where learning is the difference between a student's achievement score on the posttest and that which one would have expected knowing only his or her score on the pretest.

In table 2.2, the proportion of residual variance accounted for by allocated time is given only when the significance of that effect was at or below the .10 level. The significance level and the sign of the effect are given. The proportion variance in the posttests accounted for by the pretests is also given.

Positive results were obtained for allocated time for 6 of the 17 second-grade content areas and 5 of the 12 fifth-grade content areas. Most of the significant relationships between achievement and allocated time are not large, accounting for from 3 to 6 percent of the residual achievement variance. The data can be thought of as falling into four quadrants: second-grade reading, second-grade mathematics, fifth-grade reading, and fifth-grade mathematics. Four of the findings, which appear in three of the grade-subject quadrants, are impressive, accounting for 10 to 24 percent of the residual variance. The results are highly consistent, with significant positive effects being found in all quadrants. In no case did a significant negative effect occur. Where the effect was largest, fractions at grade five, allocated time accounted for 24 percent of the residual variance.

The residual variances found in the BTES analysis probably come close to the maximum that can be accounted for by allocated time. It will be recalled that allocated time does not take into account the time that the individual pupil is actually engaged in relevant school work and must therefore always be, by itself, a rather crude estimate of pupil work involvement. However, we have seen that even such basic time variables as attendance rates, length of school day, length of school year, and preschool attendance can have important effects on achievement. When we combine the precise outcomes of BTES with Schmidt's (1978) regression analysis and the predictions of the effects of increasing allocated time that emerged from Wiley's (1973) work, we must conclude that allocated time is a powerful tool that teachers and administrators can use to increase pupil achievement.

One would expect that when these basic allocated time variables are supplemented with more sophisticated variables such as engagement rate and success rate, we should be able to account for a substantial amount of pupil achievement. In the remainder of this chapter we will explore evidence related to this expectation.

Opportunity to Learn and Achievement

Since the development of Carroll's theoretical model, a number of investigators have related teacher estimates of opportunity to learn with pupil achievement. Researchers have used a variety of methods of estimating this variable. Opportunity to learn is a more sophisticated concept than allocated time since it deals with the coverage of specific academic content (usually related to test items) rather than dealing only with the time allocated to broadly defined content areas such as reading or mathematics. Although the content validity problem has not been adequately controlled in most studies, Rosenshine (1978) reports that of the 14 studies he located, all except 1 reported significant relationships between opportunity to learn and student achievement. We will briefly review four studies that defined opportunity to learn in terms of teacher estimates of content coverage since this appears to be the most precise measure of the opportunity-to-learn concept (Husen, 1967; Comber and Keeves, 1973; Chang and Raths, 1971; Borg, 1978).

In a study comparing coverage of basic skills content in seven "lower class" and seven "middle class" schools, Chang and Raths (1971) identified 20 items from the Iowa Test of Basic Skills that discriminated between the two kinds of schools in terms of correct responses and 20 items that did not discriminate. A questionnaire was then developed in which teachers indicated on a four-point scale the degree they had emphasized the content of each item. The mean emphasis score for "middle class" schools was significantly higher than for "lower class" schools for the discriminating items, but not for the nondiscriminating items. Although this study had several serious flaws, the results suggest a relationship between opportunity to learn and pupil achievement.

In an international study of science education, Comber and Keeves (1973) found, using the school as the unit of analysis, that opportunity to learn science concepts was significantly related to science achievement in some countries but not in others. The average correlation was .20, and correlations ranged from +.58 for Scotland to -.11 for Sweden. When the student was used as the unit of analysis, the correlations ranged from -.01 for Japan to .33 for Scotland, with a mean of .12. In this study, opportunity to learn was calculated for each school by having science teachers meet, discuss each test item, and estimate what percentage of the students

Table 2.2. Regressions Analyzing the Effects of Allocated Time and Engagement Rate: Analyses of Reading and Mathematics Achievement at Grades 2 and 5 During the B-C Period, Regressing Postachievement on Preachievement, Allocated Time, and Engagement Rate

Content category for postachievement, preachievement, and allocated time	Proportion of variance accounted for by preachievement	Allocated time[a] and engagement rate[b] effects						
		*p ≤ .10 **p ≤ .01		+ positive - negative		Unique proportion of residual variance[c]		
		Time	Engagement	Time	Engagement	Time	Engagement	Time & engagement[d]
Grade 2 (N = 139)								
Total comprehension	.32							
Decoding blends and long vowels	.49		**	+	+		.08	.09
Decoding variant consonants	.12		*	+	+		.02	.03
Decoding complex patterns: spelling time	.47	*	*	+	+	.03	.03	.07
Word structure: meaningful units	.49							
Word structure: syllables	.09	**		+	+	.05		.08
Total Reading	.68		*	+	+		.03	.04
Addition and subtraction: no regrouping	.24							
Addition and subtraction: speeded test	.35	*	**	+	+	.02	.04	.07
Addition and subtraction: with regrouping	.06	*	*	+	+	.03	.02	.04

Computational transfer	.32							
Place value and numerals	.47							
Word problems	.27	*		+	+	.02		.04
Money	.34		*	+	+		.04	.04
Linear measurement	.19							
Fractions	.05	**		+	-	.10		.10
Total mathematics	.58							
Grade 5 (N = 122)								
Total word meaning	.69		**	-	+		.15	.15
Total comprehension	.66	**		+	-	.15		.15
Word structure: syllables	.35							
Total reading	.77	*	*	+	+	.02	.02	.06
Total geometry	.12		*	+	+		.03	.04
Total multiplication	.33							
Multiplication speed test: basic facts time	.65	**	*	+	+	.06	.04	.10
Division	.30							
Fractions	.28	**		+	+	.24		.26
Computational transfer	.58							
Word problems	.38							
Total mathematics	.69	**		+	+	.06		.06

[a] Based on teacher logs.

[b] Based on observation.

[c] This is the proportion of residual variance accounted for uniquely by allocated time or engagement rate. Residual variance refers to the variance remaining in the postachievement measure after preachievement has been "removed"

[d] This is the residual variance accounted for by allocated time and engagement rate, including variance "shared" among these two variables.

Source: Fisher et al. (1978, pp. 4-26).

who took the test had had an opportunity to learn the concept that the item tested.

In an earlier international study of mathematics (Husen, 1967), a similar method was used to estimate teacher coverage. Each teacher was asked to estimate what percentage of his or her students who took the mathematics test had had an opportunity to learn the type of problem covered by each test item. A small but statistically significant positive correlation was found between test scores and teacher coverage scores. The mean correlation across 10 countries ranged from .11 to .20 for the four populations studied. However, the correlations varied greatly from one country to another. For example, the correlation was .60 for the 13-year-old sample in Scotland and -.03 for the same sample in Sweden.

Although these three studies generally report positive relationships between teacher coverage and achievement, many of these relationships are smaller than we might have expected. One possible reason for this is the procedure for measuring opportunity to learn. In the study by Chang and Raths (1971), teachers were estimating coverage over an entire school year and made their estimate a full year after the target pupils had left their classrooms. Under these conditions, there must be serious doubts about the accuracy of teachers' recollections. Similarly, in the two international studies, teachers were asked to estimate what percentage of students had had an opportunity to learn the content of each item at any time during their years at the school in question. Furthermore, in the study reported by Comber and Keeves (1973), since the teachers worked together in arriving at the school estimates, a teacher might be reluctant to admit to his colleagues that certain topics were not covered in his courses.

Although these studies have made a valuable contribution, it appears that certain changes in design might produce a more precise result. In two studies reported by Borg (1978), the investigator developed short and clearly limited content units to be taught by all participating teachers. This approach appears to have several advantages. It makes it possible to develop an achievement measure appropriate for all students in the study, permitting comparisons across classrooms. Furthermore, such a unit can deal with a topic not included in the regular school curriculum, reducing the likelihood that some pupils will have had more prior training than others related to the content. Also, by keeping the unit short, the achievement measure can cover virtually every concept in the unit. Teachers' recall of content covered should be much more accurate for a 1-week unit than for an entire year's work. Finally, a short unit permits observers to estimate the degree to which teachers adhere to the content.

In Borg's initial study, 40 intermediate grade teachers taught a 4-day content unit and estimated their coverage of each achievement item. Controlling for pupil ability and socioeconomic status, a partial correlation of

.40 was obtained between teacher coverage and pupil achievement. In the second study, 28 intermediate grade teachers were randomly assigned to two groups. All teachers taught two content units with a 2-month interval between. Order of teaching the two units was reversed for the two groups. Results differed for the two groups. However, several significant correlations were obtained between teacher coverage and pupil achievement, ranging up to .67.

It is clear that opportunity to learn is a rather crude measure as compared with the theoretical formulations of Carroll, Bloom, Wiley and Harnischfeger, and the Far West Laboratory researchers. Yet it is sufficiently powerful to yield significant relationships with achievement across a wide range of definitions and research methodologies.

Research on Engaged Time

Early Studies on Pupil Attention

Another of the variables that has been incorporated into the BTES conceptualization of ALT is engaged time. Engaged time is essentially synonymous to time on task, attention, and participation—all of which are found in the research literature.

During the two decades prior to World War II, a number of researchers investigated pupil attention and its relationship to teaching ability, achievement, and other variables. Jackson (1968) carried out an extensive review of this research. He reports a study by French in 1924 in which student behavior during recitation periods was observed in 26 elementary and junior high school classrooms. French found a correlation of .82 between a rating of teaching ability and measures of group attention during recitation periods. The median percentage of time students appeared to be paying attention was 94 for junior high school classrooms and 91 for grade school classrooms.

Similarly high levels of attention were found in other early studies. In a study of two elementary school classrooms, the average attention level was 90 percent in one classroom and 81 percent in the other (Bjarnason, 1925). In 17 eighth-grade classes, Blume (1929) found a range of attention from 90 to 98 percent. In a more extensive study (Edminston and Braddock, 1941), the mean percentage of attention in 200 classrooms varied from 80.6 to 88.2 for different kinds of activities.

Two studies by Shannon (1941, 1942) relate attention to other school variables. The first was carried out in two junior high schools, one of which employed ability grouping. There was no significant difference in attention between the two schools, but high ability groups showed higher levels of attention than lower ability groups. His second study concerned the relationships between attention and achievement. Subjects were 100 students from two seventh- and eighth-grade classes. Teachers read a 10-minute lecture, and observers recorded pupil attention at 1-minute intervals. Correlations between attention and achievement were .67 for boys and .34 for girls.

Perhaps the most noteworthy result of these early studies was that the percentage of time pupils were observed to be attending to their school work was very high. These results raise a problem that investigators working with engaged time have never satisfactorily solved; namely, can an observer determine whether a child is attending to his or her school work? There are times when the child is surely attending—for example, when s/he is working a mathematics problem or responding to a question. There are other times when a child is clearly not attending, such as when s/he is observed in some sort of disruptive behavior with other children. If, however, s/he is not actively involved in classroom activities, but is looking at the teacher, we cannot be sure whether s/he is attending or thinking of something completely unrelated to his or her school work. The work of Bloom (1976) and his students in which stimulated recall is employed gives some evidence on this question. They made sound recordings of class sessions and played them back, asking students to report the thoughts they had experienced during the class session. For students in three lecture classes at the University of Chicago, only 65 percent of the thoughts reported were related to the lecture. Only 55 percent of the thoughts reported by students in 29 discussion classes were related to the discussion. These figures are clearly much lower than the percentages of attention obtained in the earlier observational studies. Whether the self-reported recall of students is more accurate than the appearance of attention obtained by observers cannot be determined. However, the work of Bloom and his students certainly raises the question about the degree to which looking attentive actually indicates that students are attending to their school work. It may be that observational data for elementary school pupils are somewhat more valid than for college students, who may have learned that looking attentive is a wise strategy in college classrooms. A study by Hudgins (1966) sheds some light on the relationship between observational data and self reports of attention. Observational measures of *attention* correlated from -.52 to -.70 with self-reports of *inattention*.

Engaged Time and Achievement

During the past decade, a number of studies have explored the relationships between measures of pupil time on task and outcome measures such as achievement. Bloom (1974) cites studies by four of his students (Anderson, 1973; Arlin, 1973; Lahaderne, 1967; Ozcelik, 1973) that have been concerned with the amount of time students spend in active learning. They have found that measures of the amount of time the student spends directly on learning are highly predictive of the achievement of the student. The correlations, when corrected for attenuation, account for about 60 percent of the achievement variance.

Bloom cites a series of his own studies in which he compared the performance of students in conventional learning and in mastery learning conditions. He found that on the first learning task, the on-task time of both groups was about equal, about 65 percent of the time. The students in the mastery condition were then given extra time and help until they reached criterion on the first unit, while the students in the conventional group were given no help after they took the examination. On the final task, the mastery students were spending about 85 percent of their classroom time on task; the nonmastery students were spending only 50 percent of their time on task. Bloom believes that the mastery group was learning more effective learning techniques, while the conventional group was decreasing in their effectiveness as learners.

Bloom (1976) carried out an extensive review of research that explored the relationship between achievement and various measures of student participation. He located four studies of on-task behavior in which the class was the unit of analysis. These studies involved students ranging from grade one to adults (Morsh, 1956; Chall and Feldman, 1966; Soar, 1966; Belgard et al., 1968). Correlations between final achievement measures and measures of participation ranged from .19 to .51, with a median of .26. Correlations between achievement gain and participation ranged from .06 to .58 with a median of .29.

Bloom reviewed nine studies in which individual students were the unit of analysis (Bloom, 1974; Edminston and Rhoades, 1959; Krauskopf, 1963; Siegel et al., 1963; Attwell et al., 1967; Lahaderne, 1967; Sjogren, 1967; Turnure and Samuels, 1972; Anderson, 1973). For the two studies that related final achievement to on-task behavior, correlations ranged from .37 to .58, with a median of .48. For the seven studies that related achievement gain to on-task behavior, correlations ranged from .26 to .87 with a median of .46.

Since Bloom's review, some additional research has related on-task behavior to achievement. For example, an observational study of Follow Through classrooms by Stallings and Kaskowitz (1974) coded pupils as being engaged only when they were clearly working on reading or mathematics. They found correlations ranging from .3 to .6 between engaged time in reading and mathematics and achievement.

Fredrick (1977) gathered data in 184 high school classrooms in the Chicago public schools. Observers gathered data on: (1) proportion of students present, (2) proportion on task, (3) number arriving late or leaving early, (4) number of interruptions to the lesson, (5) proportion of classes assigned homework, and (6) proportion of students doing homework when assigned. High-achieving classrooms had significantly more favorable scores than the low-achieving group on five of the six variables; that is, all except the proportion of classes assigned homework. Attendance was 88 percent for the high-achieving schools, and these students were on task 92 percent of the time. Comparable percentages for low-achieving schools were 70 and 84. This research, although not linking individual student behavior with achievement, provides data on several factors such as interruptions and homework that help focus our definition of engaged time or time spent on task.

Another study (Good and Beckerman, 1978) linking achievement to engaged time was based on observations of sixth-grade pupils in two schools. Six observers collected 14 hours of observational data in each classroom. On-task behavior was slightly higher for the high-achieving pupils (75 percent) than for the low-achieving pupils (67 percent). Females were on task slightly more than males (74 percent versus 70 percent). On-task behavior varied somewhat according to the subject matter, ranging from 66 percent in music to 79 percent in spelling. The investigators suggest that the higher involvement may have occurred in subjects like mathematics and spelling because these subjects are more structured and demand more active responses from pupils. A major factor in level of on-task behavior was the type of task. For tasks assigned by the teacher, the work involvement was 74 percent as opposed to 53 percent for tasks chosen by the pupil.

Percentage of on-task behavior was highest when pupils were in small group activities or large group activities in which the teacher was involved. On-task behavior was generally less when an adult other than the teacher was involved. The smallest percentage of on-task behavior, 62 percent, was found in whole class activities led by an adult other than the teacher. Percentage of on-task behavior for small group activity with the teacher was 82; for large group activity with the teacher, 79. These were the highest percentages reported.

There were large differences in on-task behavior among the six classrooms. On-task behavior ranged from 60 to 82 percent in different classrooms, suggesting the importance of teacher behavior on pupil work involvement. The authors point out that although the difference in percentage of on-task behavior between high- and low-achieving pupils is not great, this percentage difference would, over a period of time, add up to substantial differences in on-task time.

BTES Findings on Engaged Time

Engaged time, which is defined as the simultaneous occurrence of allocated time and task engagement, is an important variable in the ALT instructional model.

The BTES collected a great deal of detailed information on engagement rates that is probably more accurate than data from most earlier studies. These rates vary from .70 to .75, which is in fairly close agreement with other recent studies of elementary pupils. For example, Good and Beckerman (1978) report rates ranging from 66 percent to 79 percent. In contrast, most early studies of pupil attention reported rates from 80 to 98 percent. These differences could be due to different operational definitions of on-task behavior. Another possibility that must be considered is that the greater proportion of teacher-centered direct instruction found in classrooms 30 years ago could have resulted in higher rates of on-task behavior. This possibility is discussed by Rosenshine and Berliner (1978).

A major conclusion from the BTES is that *the amount of time that students are engaged in relevant reading and mathematics tasks is positively associated with academic achievement*.

Analyses of the relationship between Academic Learning Time variables and student achievement were conducted separately on the October-December (A-B) and the January-April (B-C) data to provide replications of the analyses. In practice, however, the A-B analyses were primarily exploratory; the B-C analyses were more confirmatory. Since the B-C analyses are based on a much larger data set and were focused and improved based on the experience with the A-B analyses, the results can be accepted with somewhat more confidence. However, the A-B results certainly deserve serious attention, since the A-B data set is doubtless the best research evidence available on engaged time prior to the B-C phase of the study. Of course, relationships that emerge from both sets of analyses are those that deserve the greatest attention, elaboration, and possible application.

A-B Analyses. Table 2.3 presents the results of the regression analyses on the effects of engaged time in reading and mathematics on achievement during the A-B period. Results are given for subtopics under reading and mathematics as well as for total reading and total mathematics. The proportion of total postachievement variance accounted for by preachievement is given.

The results in table 2.3 indicate that engaged time was positively related to student learning in three of the four reading content areas, including total reading at grade two. No significant results emerged in grade five reading.

Table 2.3. Regressions Analyzing the Effects of Engaged Time:
Analyses of Reading and Mathematics Achievement at Grades 2 and 5 During the A-B Period, Regressing Postachievement on Preachievement and Engaged Time

Content category for postachievement, preachievement, and engaged time	Proportion of variance accounted for by preachievement	Engaged time^a effects		
		Significance *p ≤ .10 **p ≤ .01	Sign + positive − negative	Proportion of residual variance^b
Grade 2 (N = 127)				
Total comprehension	.31	**	+	.08
Total decoding	.65			
Total word structure	.40	*	+	.04
Total reading	.71	*	+	.05
Addition and subtraction: no regrouping	.41			
Addition and subtraction: speeded tests	.49			
Computational transfer	.28			
Place value and numerals	.38			
Word problems	.29			
Money	.43			
Total mathematics	.63			

	Grade 5 (N = 122)			
Total word meaning	.58			
Total comprehension	.71			
Word structure: syllables	.41			
Total reading	.81			
Total geometry	.24	**	+	.13
Total multiplication	.28	**	+	.14
Multiplication speeded tests, basic facts time	.54	*	-	-.03
Division	.24	**	+	.06
Fractions	.08	**	+	.20
Computational transfer	.55			
Word problems	.22			
Total mathematics	.70			

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[a] Computed by taking the product of allocated time in the content category (based on teacher logs) and engagement rate (based on observation).

[b] This is the proportion of the residual variance accounted for by engaged time, where residual variance refers to the variance remaining in the postachievement measure after preachievement is "removed."

Source: From Fisher et al. (1978, pp. 4-17).

In the seven grade two mathematics areas there were no significant relationships with residual achievement, but results were significant for five of the eight areas in grade five mathematics. Proportions of significant residual variance ranged from .04 upward, with four of the eight significant variances ranging from .08 to .20. The largest effect was for fractions at grade five, where 20 percent of the residual variance was accounted for by engaged time. All but one of the significant engaged time effects were positive, and the one negative effect (multiplication speed tests at grade five) was the smallest of the significant effects.

B-C Analyses. The results of analyses of engaged time in reading and mathematics at grades two and five during the B-C period can be found in table 2.4. Some changes were made by the investigators in the set of test scales administered at grade two for the B-C period as compared with those for the A-B period. These changes were made to reflect changes in instructional emphasis from one period to the next.

The B-C analyses of engaged time confirmed the positive effects found with the A-B data but were more consistent in that positive effects were found in all four quadrants (reading and mathematics at grades two and five). No significant negative effects were found for engaged time in the B-C period. Where the negative A-B result had occurred (multiplication speed tests), a significant positive effect was found in the B-C analyses. The strongest effect was for fractions at grade five, where 26 percent of the residual postachievement variance was accounted for by engaged time.

The second set of B-C regressions analyzed allocated time and engagement rate as two separate variables. It had been found in the A-B analyses that separating engaged time and low error rate was more effective than combining them in terms of predicting student learning. Therefore, it was decided to determine the effect of separating allocated time and engagement rate.

Table 2.2, which we discussed in part with regard to allocated time effects, presents the results of analyses of allocated time and engagement rate in reading and mathematics during the B-C period. Consistent, positive results were obtained for both allocated time and engagement rate. When these are analyzed as two separate variables, they are more highly predictive of student learning than is their product, engaged time. The two separate variables taken jointly often account for more variance than their single product, and they never account for less. They jointly account for an average of 4.9 percent of the residual variance, while their single product accounts for an average of 3.1 percent. Therefore, allocated time and engagement rate are more strongly related to student learning when analyzed as two separate variables, and they were so entered in subsequent analyses.

Summary

Research evidence accumulated over the past 36 years shows consistent positive relationships between time on task and achievement. When we find 16 studies that differ in virtually every aspect of design and yet yield consistent positive results, we can be very confident that the relationships found are real and enduring. Although some correlations between achievement measures and on-task time are as high as .87, the majority are in the range from .30 to .50, thus accounting for 9 to 25 percent of the achievement variance. Virtually all the significant relationships found in the two phases of the BTES also fall into this range. These results clearly demonstrate that schooling does make a difference.

The evidence on engaged time should not come as a surprise since it is clear that one cannot learn without devoting time to learning. However, one needs only to visit a few classrooms to see that tremendous amounts of time in most are not being devoted to relevant learning tasks. This observation is supported by research evidence on wait time, transition time, and similar variables. Therefore, although the importance of engaged time is self-evident, it is equally evident that many teachers are unable to increase this important factor and in many cases are themselves guilty of wasting a great deal of time that should be devoted to learning. We already have some knowledge of factors that can lead to increases in engaged time in the classroom. The BTES findings contribute substantially to that knowledge. We must now develop effective programs to give teachers both preservice and inservice training in skills and strategies that will increase the time students devote to relevant academic learning.

Research on Academic Learning Time

We have reviewed previous research and the BTES results relating allocated time and engaged time to achievement. Although there has been no previous work on academic learning time as defined in the BTES, much of the earlier work leads up to the ALT concept and includes some of the same variables. Carroll (1963), Wiley and Harnischfeger (1974), and Bloom (1976) all include some estimate of quality of instruction in their models, a variable that also figures prominently in the BTES model. All three models also include a variable similar to task engagement. This variable is incorporated as well in Cohen's (1969, 1971) work in reading and in recent major research projects such as the Follow Through studies by Stallings and Kaskowitz (1974).

We will now examine the most sophisticated of the BTES time variables, Academic Learning Time, and review the relationship between this variable and pupil achievement. ALT is defined operationally in the BTES

Table 2.4. Regressions Analyzing the Effects of Engaged Time: Analyses of Reading and Mathematics Achievement at Grades 2 and 5 During the B-C Period, Regressing Postachievement on Preachievement and Engaged Time

Content category for postachievement, preachievement, and engaged time	Proportion of variance accounted for by preachievement	Engaged time^a effects		
		Significance $^*p \leq .10$ $^{**}p \leq .01$	Sign + positive - negative	Proportion of residual variance^b
Grade 2 (N = 139)				
Total comprehension	.32			
Decoding blends and long vowels	.49	*	+	.03
Decoding variant consonants	.12			
Decoding complex patterns: spelling time	.47	**	+	.05
Word structure: meaningful units	.49			
Word structure: syllables	.09	**	+	.07
Total reading	.68	*	+	.02
Addition and subtraction: no regrouping	.24			
Addition and subtraction: speeded test	.35	*	+	.03
Addition and subtraction: with regrouping	.06	*	+	.03
Computational transfer	.32			

Place value and numerals	.47			
Word problems	.27	*	+	.03
Money	.34			
Linear measurement	.19			
Fractions	.05	**	+	.10
Total mathematics	.58			
		Grade 5 (N = 122)		
Total word meaning	.69			
Total comprehension	.66	**	+	.14
Word structure: syllables	.35			
Total reading	.77	**	+	.06
Total geometry	.12			
Total multiplication	.33			
Multiplication speed test, basic facts time	.65	**	+	.05
Division	.30			
Fractions	.28	**	+	.26
Computational transfer	.58			
Word problems	.38			
Total mathematics	.69	*	+	.03

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[a] Computed by taking the product of allocated time in the content category (based on teacher logs) and engagement rate (based on observation).

[b] This is the proportion of the residual variance accounted for by engaged time, where residual variance refers to the variance remaining in the postachievement measure after preachievement is "removed."

Source: From final report, pp. 4-24.

analyses as the simultaneous occurrence of allocated time, engagement rate, and high success rate. In other words, ALT is the time a pupil is engaged in the study of relevant content that s/he can learn making no more than chance errors. Since content that generates low success rate is hypothesized in the ALT model to lead to lower achievement, this variable was also included in the regression analyses.

One of the major conclusions emerging from the BTES analysis was that *Academic Learning Time is positively related to student achievement.* Let us now review the evidence that supports this conclusion.

A-B Analyses

The analyses of ALT and learning consisted of a series of regressions that examined the joint effect of all four ALT variables together for both the A-B and the B-C period data sets. The results for the A-B period are presented in table 2.5, and those for the B-C period are in table 2.6. As has been the case for the preceding tables, when a variable showed a significant effect ($p < .10$), the unique proportion of residual variance accounted for is reported. In addition, the sign of all effects, regardless of significance, is reported. The joint contribution of all four ALT variables is reported for each content category, even when no variable shows a unique individual effect that is significant. An examination of table 2.5 shows that in general, allocated time, engagement rate, and low error rate are each positively associated with achievement, while high error rate is negatively related to achievement.

However, in this section we are concerned primarily with the combined effect of ALT, so will not examine in depth the individual influences of the four ALT variables. For grade two, the residual variance accounted for by the combined ALT variables range from .02 to .12. For the four individual ALT variables, there were 7 of 16 significant residual variances in reading and 8 of 28 in mathematics.

For grade five, the residual variance for the combined ALT variables ranged from .02 to .23. There were 4 of 16 significant residual variances for the individual ALT variables for grade five reading and 13 of 32 for mathematics. There were significant residual variances for all four ALT variables and for the combination of these variables in all four quadrants. Of the significant effects ($p < .10$), there was only one exception to the generalization that effects for allocated time, engagement, and low error rate were positive, while those for high error rate were negative. This exception was the negative effect for allocated time in addition and subtraction speed tests at grade two during the A-B period.

B-C Analyses

Table 2.6 shows that the B-C results are somewhat stronger and more consistent than the A-B results. The one significant result in the A-B analysis that was contrary to the ALT model, (allocated time, grade two, addition and subtraction speed tests) was positive in the B-C analysis. For second-grade reading, the residual variance for the combined ALT variables ranged from .03 to .21 and averaged .12, as compared with .07 for the A-B period. Twelve of the 28 residual variances for the four individual ALT variables were significant. For grade two mathematics, the combined ALT variances ranged from .01 to .22, with an average of .08, double the .04 average for the A-B analysis. For the individual ALT variables, 11 of 40 residual variances were significant.

For grade five reading, the residual variances for combined ALT ranged from .05 to .21, with a mean of .13, as compared with a mean of .03 for the A-B analysis. Combined residual variances for mathematics ranged from .01 to .30, with a mean of .11, as compared with .09 for the A-B period.

Overall, there were 41 significant residual variances, or 35 percent, for the B-C analysis and 31 (omitting the one negative result), or 34 percent, for the A-B analyses.

The specific reading and mathematics content areas were not identical for the A-B and B-C periods because of changes in curriculum, mostly in grade two reading. The grade five content areas were identical for the two periods, and only three new areas were added to grade two mathematics for the B-C period. Thus, many direct comparisons are possible between regressions for specific content areas and ALT variables between the two periods.

Table 2.7 summarizes the specific agreements and disagreements between the two periods. Of the 84 direct comparisons possible (i.e., same ALT variables—same grade, and same subject area) 47 residual variances were significant in one or both periods. Of these 47, 11 were significant in both periods. When we consider that the probability that a result at the .10 level will occur in two consecutive replications is only .01, these results are impressive.

Conclusion

In tracing the previous research on allocated time and engaged time, we find consistent relationships with pupil achievement that increase as research focuses more sharply on the actual time the individual pupil devotes

Table 2.5. Regressions Analyzing the Combined Effects of ALT Variables: Analyses of Reading and Mathematics Achievement in Grades 2 and 5 for the A-B Period, Regressing Postachievement on Preachievement, Allocated Time, Engagement Rate, Low Error Rate, and High Error Rate

Content category for postachievement, preachievement, and allocated time	Proportion of variance accounted for by preachievement	Unique proportion of residual variance[a]				Residual variance, combined ALT variables[d]
		+ positive effect - negative effect		*p ⩽ .10 **p ⩽ .01		
		Allocated time[b]	Engagement rate[c]	Low error[c]	High error[c]	
		Grade 2 (N = 127)				
Total comprehension	.31	+ .03*	+ .02*	+	-	.09
Total decoding	.65	-	+ .01*	+	+	.02
Total word structure	.40	+ .02*	+	+ .08**	+	.12
Total reading	.71	+	+ .01*	+ .01**	+	.03
Addition and subtraction: no regrouping	.41	+	+	+ .03*	+	.04
Addition and subtraction: speeded tests	.49	- .01*	+	+ .02*	+	.05
Computational transfer	.28	+ .03*	-	+ .03*	- .02*	.11
Place value and numerals	.38	+	+	+	+	.02
Word problems	.29	-	+	+	+	.02
Money	.43	+	+	+	-	.02
Total mathematics	.63	+	+ .01*	+ .02**	+	.04

			Grade 5 (N = 122)			
Total word meaning	.58	-	+	+ .02**	-	.03
Total comprehension	.71	-	+ .01*	+ .03**	+	.06
Word structure: syllables	.41	-	+	+	-	.02
Total reading	.81	-	+	+ .02**	+	.15
Total geometry	.24	+ .12**	-	+ .02*	-	.15
Total multiplication	.28	+ .05**	+	+ .03**	- .03**	.16
Multiplication speeded tests: basic facts time	.54	-	+	-	-	.02
Division	.24	+ .02*	+ .02*	+	-	.05
Fractions	.08	+ .22**	+ .02*	+	-	.23
Computational transfer	.55	-	+	+	- .01*	.04
Word problems	.22	+	+	+ .03*	- .02*	.07
Total mathematics	.70	-	+	+	- .02**	.02

[a] This is the proportion of the residual variance accounted for uniquely by the independent variable specified, where residual variance remaining in the postachievement measure after preachievement is "removed."

[b] Based on teacher logs.

[c] Based on observation.

[d] This is the residual variance accounted for by allocated time, engagement rate, low error rate, and high error rate, including variance "shared" among these four variables.

Source: From Fisher et al. (1978; pp.4-30).

Table 2.6. Regressions Analyzing the Combined Effects of ALT Variables: Analyses of Reading and Mathematics Achievement in Grades 2 and 5 for the B-C Period, Regressing Postachievement on Preachievement, *Allocated* Time, Engagement Rate, Low Error Rate, and High Error Rate

Content category for postachievement, preachievement, and allocated time	Proportion of variance accounted for by preachievement	Unique proportion of residual variance[d]				Residual variance, combined ALT variables[d]
		+ positive effect - negative effect		* $p \leq .10$ ** $p \leq .01$		
		Allocated time[b]	Engagement rate[c]	Low error[c]	High error[c]	
		Grade 2 (N = 139)				
Total comprehension	.32	+	+	+	-	.03
Decoding blends and long vowels	.49	+ .03*	+ .04*	+ .02*	- .03*	.17
Decoding variant consonants	.12	+	+	+ .08**	-	.13
Decoding complex patterns: spelling time	.47	+ .02*	+ .02*	+ .10**	-	.21
Word structure: meaningful units	.49	+	+	+	-	.03
Word structure: syllables	.09	+ .06**	+	+ .04*	-	.14
Total reading	.68	+	+	+ .03*	- .02*	.11
Add and subtract: no regrouping	.24	-	+	+ .03*	-	.04
Add and subtract: speeded test	.35	+ .03*	+	+ .14**	-	.22
Add and subtract: with regrouping	.06	+ .03*	+	+	+	.06
Computational transfer	.32	+	+	+ .05**	+	.06

Place value and numerals	.47	-	-	+	-	.01
Word problems	.27	+ .02*	+	+	- .02*	.07
Money	.34	-	+	+ .02*	- .03*	.12
Linear measurement	.19	0	+	+	-	.04
Fractions	.05	+ .10**	-	+	+	.11
Total mathematics	.58	+	+	+ .03*	-	.06
		Grade 5 (N = 122)				
Total word meaning	.69	-	+ .13**	-	-	.15
Total comprehension	.66	+ .14**	-	-	- .06**	.21
Word structure: syllables	.35	-	+	-	- .04*	.05
Total reading	.77	+	+	-	- .03*	.11
Total geometry	.12	+	+ .03*	-	- .03*	.07
Total multiplication	.33	+	-	+	- .06**	.11
Multiplication: speed test: basic facts time	.65	+ .02*	+ .03*	+ .03*	+	.13
Division	.30	+	-	-	- .06**	.09
Fractions	.28	+ .17**	+	-	- .04**	.30
Computational transfer	.58	-	-	+ .03*	- .05**	.10
Word problems	.38	-	0	+	-	.01
Total mathematics	.69	+ .05**	+	+	- .02*	.03

[a]This is the proportion of the residual variance accounted for uniquely by the independent variable specified, where residual variance refers to the variance remaining in the postachievement measure after preachievement is "removed."

[b]Based on teacher logs.

[c]Based on observation.

[d]This is the residual variance accounted for by allocated time, engagement rate, low error rate, and high error rate, including variance "shared" among these four variables.

Source: From Fisher et al. (1978, pp. 4-31).

Table 2.7. Comparison of the Two Periods

	Number of AB-BC comparisons	Residuals significant in AB only	Residuals significant in BC only	Residuals significant in both periods
Grade 2 reading	8	3	1	1
Grade 2 mathematics	28	3	4	5
Grade 5 reading	16	3	4	1
Grade 5 mathematics	32	9	9	4

to relevant academic work. The BTES findings, although derived from a much stronger and more sophisticated data base, are substantially in agreement with earlier research.

The ALT model is a great leap beyond the previous research on engaged time since it incorporates into the BTES analysis variables such as an instructional strategy and difficulty level. The theoretical work of Carroll, Bloom, and Wiley and Harnischfeger also considers such variables, and it is clear that their thinking has had an important influence on the ALT model of school learning. This model, however, appears to be a clear advance over the earlier formulations, and appears to form a useful basis for making future decisions regarding time allocations and for shaping future policies in areas such as teacher education and certification.

Although some evidence has been assembled that supports the earlier models of school learning, there is much more evidence supporting the ALT model that has emerged from the BTES.

3

Salient Features of the BTES Framework of Teacher Behaviors

Thomas A. Romberg

The Academic Learning Time framework of classroom instruction, with its specification of instructional functions, as developed in the Beginning Teacher Evaluation Study, has considerable heuristic value in posing new research questions and in forming important policy issues in education. The relationship of the framework to instructional research and institutional characteristics of schools merits the attention of both researchers and educators. Its implications for policy at all levels of the educational sphere deserve the serious consideration of persons whose decisions are aimed at improving schooling.

The BTES concept of schooling focuses on the amount of instructional time to which students are exposed in school and the amount of time they actually spend learning. Exposure to learning is related to both instructional planning actions and instructional interaction behaviors of teachers.

The Academic Learning Time Framework

The underlying principle of the framework is that pupils' activities are central to their learning. Learning is a process that takes place in time. A student learns a given subject to the extent that s/he has the opportunity to learn and that s/he spends time actively engaged in learning; that is, paying attention, studying, trying to learn.

Description of the ALT Framework

Academic learning time (ALT) is the term used by the BTES staff to describe student learning. Teacher behaviors are considered to be a part of the instructional process/environment element of the model. It is important in this framework that teacher behaviors are directly related to the engaged learning time of students. Pupil engaged time, in this model, is the immediate dependent variable for studies of teacher behavior. The basic proposition of the BTES framework is: *What teachers do, directly influences the time a child is actively engaged in learning*. This relationship is so simple and so obvious that it sounds naive, but somehow it has escaped extensive study.

"Student learning time" as an interim variable between teacher behaviors and pupil achievement has been considered before.[1] However, "student time" has been used only as an independent variable to predict some student performance variable such as an achievement test score.[2] The practical importance of shifting engaged time from its role as one of many predictor variables of achievement to being the primary dependent variable for classroom studies cannot be underestimated.

The teaching behaviors that influence student classroom learning were thought by the BTES staff to be six interrelated functions (diagnosis, prescription, presentation, student activity, monitoring, and feedback) that occur through time in a roughly cyclical fashion.

In essence the basic BTES Academic Learning Time framework is a process-product teacher effects model as described by Doyle (1977). The instructional processes within the BTES framework have been formulated in terms of a diagnostic-prescriptive framework where the product is student engaged time rather than student achievement.

The potential practical importance of identifying causally related functions for teacher instructional planning and instructional interaction must be pointed out. In the past, long lists of teacher behaviors have been examined and related to student performance. Replacing long lists by a small set of generic teaching functions should help in reorienting research toward explanatory theories of teaching.

The BTES staff defined the variables[3] of the Academic Learning Time framework as follows: First, as an index of student classroom learning the teacher's *allocated time* for reading and mathematics instruction on relevant tasks was used as a starting point. Task relevance was included to improve the prediction of achievement. Only those tasks measured by the achievement tests were considered relevant. Next, they estimated the number of minutes (of the allocated time) students were engaged in learning (as opposed to time spent waiting, or in transition between tasks, or off task, or engaged on nonrelevant tasks). This time scale was further refined by adjusting engaged time for student success rate.

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[1] For an overview of studies using "time" as a variable see Karweit (1976).

[2] This relationship of engaged time to achievement was also studied in BTES (see Fisher et al., 1978). Also see "Time and School Learning" by Borg in the present volume for an analysis of that relationship.

[3] Each of the variables is operationally defined in terms of coded observed behaviors. Thus, the labels refer to codes rather than logical categories.

Success rate, as used in ALT, is a complex concept that warrants elaboration. It is intended to reflect the degree to which the student understands the learning task correctly. If the task is very difficult and the student produces few correct responses during the task, the activity will not produce much learning. On the other hand, if the student produces many correct responses on the task, it is hypothesized that learning is occurring.

Success rate was assessed in BTES in three fairly broad categories. High success rate described situations where the student had a good grasp of the task and made errors at about the chance level ("careless" errors). If a student did not understand the task and made correct responses at about chance level, the situation was labeled low success rate. Situations that fall between low and high success rate were defined as medium success rate. Medium success rate involves partial knowledge, where the student understands enough to produce some correct responses but also commits errors. ALT includes only engaged time spent on high success rate tasks. Task relevance was included to improve the prediction of achievement. Only those tasks measured by the achievement tests were considered relevant.

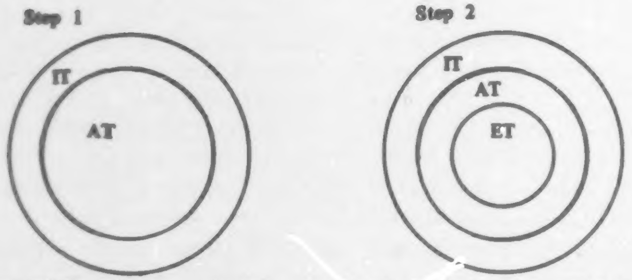
In summary, Academic Learning Time (ALT) is time spent by a student engaged on a task in which few errors are produced, and where the task is directly relevant to an academic outcome. The steps used to define ALT are shown in figure 3.1.

To complement ALT, a second pupil activity variable also was identified; namely, that portion of relevant, engaged time spent on tasks with a low success rate.

Second, to define the instructional process variables, the teaching behaviors included in the BTES were first grouped according to three functions of interactive teaching behavior: presentation, monitoring, and feedback. Three types of *presentation* were included–explanation-planned, explanation-need, and structure/direct. For planned explanation, the teacher provides substantive academic information to the student. This type of presentation is similar to a lecture. For explanation based on need, the teacher provides substantive information specifically in response to perceived needs or misunderstandings of the student. Structure/direct involves presentation of procedural information.

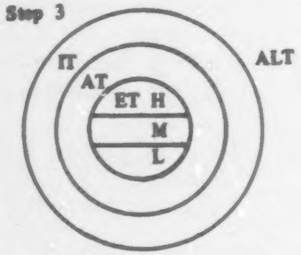
Two types of *monitoring* were included–academic observation and academic questioning. Monitoring was defined as behavior which provides

Figure 3.1 Definition of ALT



Allocated Time (AT) as a subset of Relevant Instructional Time (IT)

Engaged Time (ET) as a subset of Allocated Time (AT)



Engaged Time separated into high (H), middle (M), and low (L) success rates. Academic Learning Time (ALT) as Engaged Time with high success rate

information for the teacher about how well a student performs a particular task. For academic observation, some evidence of performance is overtly present, and the teacher examines the evidence. For academic questioning, the teacher asks a question to elicit an observable response.

Two types of feedback were included—academic feedback and task engagement feedback. Feedback lets students know how they are doing; it helps evaluate self-performance. For academic feedback, the student may receive information about his or her academic performance or may learn whether the answer is right or wrong, or what the right answer is. In task engagement feedback, the student is told whether the behavior is acceptable or unacceptable, or what s/he should be doing.

Defining the variable involved in planning–categorized in the framework under the labels diagnosis and prescription–proved to be more difficult. The total number of measures actually obtained was larger than the number of classes in the study, a mind-boggling task for quantitative analysis. The BTES staff anticipated that many measures would prove unreliable, and they desired multiple opportunities to measure important variables. Nevertheless, it was a major undertaking to reduce the size of the variable pool in a manner that was satisfying to both the logic of the measures and the empirical evidence of interrelationships.

Diagnosis refers to the teacher's ability to recognize the strengths and weaknesses of individual students. Three variables were selected to represent the domain of diagnosis. The first, item prediction, is a direct measure of the teacher's ability to predict how each target student will perform on a representative set of items from the achievement battery. The second diagnosis variable is knowledge of subject matter. It was derived from the teacher's performance on a content coding test, and it reflects the teacher's grasp of the concepts and terminology of reading and mathematics pedagogy. Such knowledge presumably provides a framework for diagnosis. The third diagnosis variable is an interview-based rating of differentiated perceptions. The rating reflects the degree to which the teacher is aware of and comments on individual characteristics and needs of different target students. It is not necessarily cognitive in focus and says nothing about the accuracy of the teacher's differentiations. Presumably, like knowledge of subject matter, perception of individual students provides a precondition for diagnosis.

Finally, the prescription function was the most complex to assess. It refers to the teacher's decisions about what to do in the classroom. A way of looking at prescription chosen by the BTES staff was to examine how instructional decisions were made. Three variables were selected to describe specific aspects of the way prescription decisions are made.

The first prescription variable is a rating of goal orientation. It combines goal-directedness–a rating of the extent to which the instructional program identifies specific goals for learning activities–and content goal assessment–a rating of the extent to which the program includes both testing to see if goals are reached, and specification of the next instructional steps to be taken, depending on whether goals are reached. These two ratings were combined to indicate the extent to which the program is goal oriented. In a highly goal-oriented program, decisions are based on an orderly progression toward clearly stated goals.

The second prescription variable is program change based on need. On each day of observation, the teacher was asked if any changes had occurred in the target students or their program. One type of response the teacher made was to report a change in a student's program because of something that had been observed about the student's performance. For instance, the teacher might have noticed a student having trouble with some concept and assigned special homework. The score used for these analyses was the average of the number of program-change-need statements made throughout the year for observed students. This variable provided a relatively objective measure of the extent to which teachers decide to make changes based on ongoing observation of student performance.

The third prescription variable is a rating of flexible use of curriculum materials. It differentiates between teachers who strictly follow the procedures and sequences contained in curriculum materials and teachers who continually modify materials and procedures based on student responses. It reflects the extent to which decisions are made by choosing a curriculum and following its mandates, as opposed to using a more complex, ongoing, adaptive decision framework.

In summary, to study the relationship of the five types of teacher behaviors (diagnosis, prescription, presentation, monitoring, and feedback) to student activity, the BTES operationally defined 14 variables. The overall framework is shown in figure 3.2.[4]

The instrumentation and analysis techniques need some discussion. Although this is not the place to discuss in detail the technical details of how data collection instruments were developed and used, how the data were scaled, and how analyses were carried out, the researcher interested in the conceptual ideas of this ALT model would be well advised to read carefully the voluminous documentation of these procedures provided by the BTES staff. A few comments, however, are in order. First, the primary procedure for gathering data on ALT and the presentation, monitoring, and feedback variables was direct observation. The actions of a sample of students in each classroom and the related teacher actions were coded. Observations were gathered on several occasions over a year of instruction. Second, data on allocated time and on the diagnosis and prescription variables were collected from a variety of traditional sources—teacher logs,

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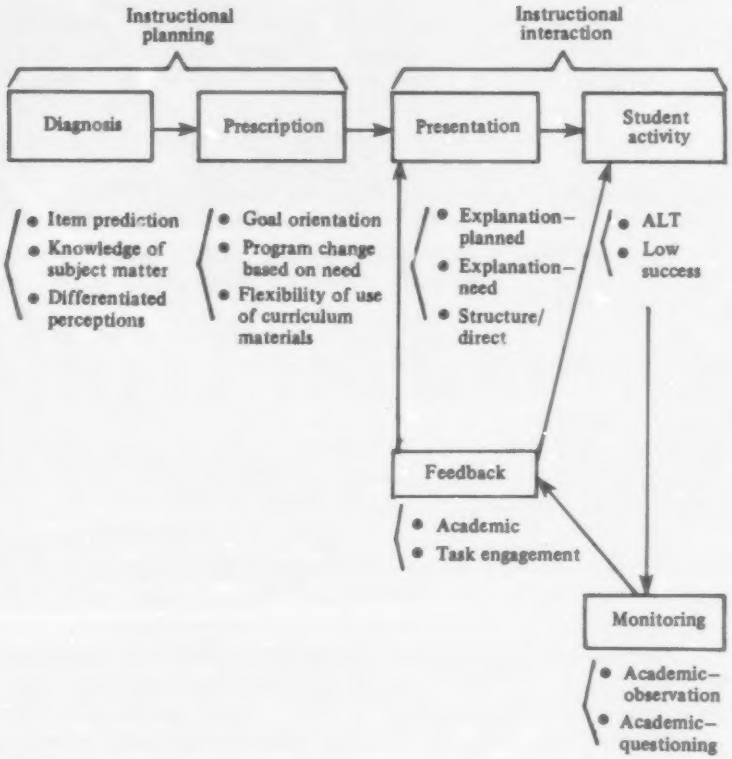
[4] In addition to these 14 variables other general information about classrooms was collected. This information was later organized into five general variables (Appropriateness of Instruction to Student Needs, Global Rating: Like Class?, Perceived Academic Competence, Orientation Toward Affect, and Learning Environment). For the BTES study these variables were not conceived as measures of the five types of teacher behaviors.

Figure 3.2 The 15 Operationalized Variables Used in the BTES Schematic of Instructional Functions in the ALT Framework


Instructional planning
Instructional interaction
Diagnosis
Prescription
Presentation
Student activity
Item prediction
Knowledge of subject matter
Differentiated perceptions
Goal orientation
Program change based on need
Flexibility of use of curriculum materials
Explanation–planned
Explanation–need
Structure/direct
ALT
Low success
Feedback
Academic
Task engagement
Monitoring
Academic–observation
Academic–questioning

teacher interviews, questionnaires, and general observations. In several cases, raw data from these sources were combined and statistically transformed to create scales for later analysis. Thus, for several variables, the label given to a scale refers to a score derived from several sources. Third, much of the analysis, although carefully and exhaustively documented, must be called exploratory. Means, correlations, transformations, a variety of reliability indexes, and other statistics are presented and discussed. Finally, although the relationship between variables in the teacher behavior-student activity portion of the ALT model is explicit, the analytic procedures adopted were not intended to test the model. The methodological technique used was multiple regression analysis with ALT or student achievement as the dependent variable and the diagnosis, prescription, presentation, monitoring, feedback, and several other variables used as predictors. The other variables included a potpourri of environmental and general variables considered to be important but not explicitly part of the teacher behavior-student activity portion of the ALT model.[5] Although procedures more appropriate for testing this model could have been used, the analysis plan was consistent with the exploratory nature of the study.

Properties and Assumptions of the ALT Model

Several properties and assumptions of the BTES ALT model deserve attention. It is a model in the true, but exploratory, sense of the term; that is, it represents a conceptual scheme that identifies a set of teacher behaviors relative to student activities and posits relationships among them. It is not a theory because it does not explain the causal mechanism underlying the relationships. Nor does it state the precise nature of these relationships by specifying, for example, a functional form to define the way in which the variables interact. Instead, it describes the process of student learning by presenting a small number of independent concepts about planning and interaction, and it hypothesizes causal relationships among them. However, since the causal relationships are considered to be suggestive, the causal structure is not examined.[6]

Second, the model applies to the instructional activities of students and is not intended to explain the socialization or social development of children within the school context. Teacher efforts to influence students' attitudes, norms, values, and social behavior are not defined as learning tasks and, consequently, are ignored. Similarly, peer influences on pupils' motivation and effort are omitted. To the extent that variables which influence attitudes and motivation have an impact on engaged time, the omission of these factors is a limitation of the model.[7]

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[5] See footnote 3.

[6] The conceptual power of identifying generic teaching functions is in its potential for theory building. That is, causal relationships are predicted for functions hypothesized to be episodic. Variability on "diagnosis" causes variability on "prescription"; variability on "prescription" causes variability on "presentation," and so on. The arrows in figures 3.1 and 3.2 indicate the hypothesized directions of causality. These hypothesized causalities, however, were not tested in the BTES analysis. Techniques for doing such an analysis using structural equations are available. The decision not to carry out such an analysis was a deliberate one by the BTES staff. It was based on the exploratory nature of the study, the need to do potentially complex data aggregations for the sets of variables associated with each instructional function, and the lack of adequate resources.

The appropriate area of application of the model is the traditional classroom. The model assigns a central role to the teacher. All institutional effects on pupil engagement are mediated through the teacher. Teacher activities to determine learning are the primary influence on pupil pursuits. The model implies a classroom in which the teacher is the main authority figure and has considerable control over students' activities and time. The extent to which other organizational arrangements require other teaching functions in this model is limited. Some of these five functions (and more likely some of these 14 variables) will undoubtedly be more or less appropriate for study in open learning, team teaching, or correspondence teaching situations. The utility of this model to other organizational arrangements is open to question.

Academic Learning Time as defined is in large part dependent on the test items selected to measure achievement. Task relevance was not determined by curricular appropriateness, but by whether tasks were related to test items. Thus, work on study skills in reading or problem solving in math, for example, would not be coded as relevant, if corresponding items were not on the achievement battery. To the extent that many important curricular outcomes are difficult to measure, this too is a limitation of the model.

Concerning the property of relevance, there is an implicit belief that the only important outcome of instruction related to a curriculum area is acquiring new knowledge as represented in terms of gain scores. Time spent on maintaining skills acquired at an earlier time or preparing students for subsequent learning is not coded as relevant, since change in test performance over time would not be expected.

Furthermore, the model rests on several assumptions. The initial one is that the strongest determinant of academic achievement is the amount of time a student is actively engaged in learning. A related assumption is that considerable differences exist in the amount of time students are exposed to learning and in the amount of time they are actively engaged in learning. These factors make up the quantity of schooling and vary across schools in terms of length of the school day and year, across teachers in terms of allocation of time and appropriateness of instruction, and across pupils in terms of effort, ability, and opportunity to learn.

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[7] In one sense engaged time could be considered as a measure of motivation. However, it would be preferable to have independent estimates of attitude, motivation, and peer influences that can be used to predict ALT. (See figure 3.2 for an example of how motivation or pupil perseverance is related to time spent.)

The major assumption of the model is that teachers do have an effect that operates directly on pupil activity. This assumption differentiates the ALT model from most other rationalistic notions of the learning process, which view school, teacher, and classroom variables as having a direct effect on student achievement.

An additional related assumption is that the amount of learning time is believed to be related directly to achievement. Thus, the transitive relationship, teacher activity⟶ pupil activity⟶ achievement, is assumed in this model.

Another assumption is that all engaged time is qualitatively the same. That is, 20 minutes of engaged time for one student produces the same achievement as 20 minutes of engaged time for another student.

Finally, the ALT model assumes that school work can be divided into a number of distinct learning experiences or activities. This is a simplifying assumption that ignores the possibility that material in one subject may be learned while studying another; for example, that mathematics performance may improve while the student is solving quantitative problems in social studies or science. It also precludes a view of learning as a maturation process that requires input other than instruction and study to understand the subject matter.

The explanatory and predictive power of the ALT model rests to a large degree on the validity of these properties and its underlying, untested assumptions. To the extent that they are testable, empirical evidence should be sought to assist in evaluating the model.

Location of the ALT Framework in the Literature

It is important to see the ALT framework in relation to an extensive body of literature on teaching.

The BTES general framework of instruction involves two propositions that, in turn, can be used to derive a third:

1. Teacher actions imply student learning activity;
2. Student learning activity implies student achievement; and, therefore, by transitivity one can deduce that
3. Teacher actions imply student achievement.

The relationship of proposition 2, student activity predicting achievement, fits within the body of sociological research on exposure to schooling. The particular notion of Academic Learning Time as a proxy for student learning fits within psychological research on learning. The teacher behaviors fit within the process-product conception of teacher behavior research, using a medical diagnosis-prescription analogy. Again, what is unique about the BTES ALT model is proposition 1.

Research on exposure to schooling focuses on whether increasing the amount of time a child spends in school has a positive effect on his achievement level. This perspective assumes that learning takes place in the school setting. It concentrates on the student as the active learning agent and is less concerned about differences between schools. Absenteeism, length of school day and year, and attendance at summer school are relevant variables expected to effect educational outcomes. The ALT model clearly is within the tradition of research on exposure to schooling. Given its particular learning-theoretic orientation, the model assumes that increased exposure implies greater learning. Since most research in this area is limited to studies of the effects of absenteeism or summer school, the ALT model is more comprehensive because it relates productive quality of schooling to environment.

Psychological learning theorists have formulated a number of models to explain the process of learning and acquisition of knowledge. Carroll (1963, 1973) conceived of five variables that influence learning: three of them—aptitude (intelligence, prior learning), ability to understand instruction, and quality of instruction—affect time needed to learn. The remaining two—time allowed (opportunity) and perseverance—determine time spent learning. Bloom (1971, 1973) views learning as determined by student motivation and the amount of time needed for a student to learn a specific task.

The central tenet of the ALT framework is that pupil pursuits determine achievement. The model relies on learning theory for an explanation of this causal link. Learning theory explicates how degree of learning, a function of actual learning time and rate of learning, affects the amount of learning. The studies of Carroll (1968, 1973), Bloom (1971, 1973), and, in particular, Harnischfeger and Wiley (1975) provide support for this proposition. However, the ALT framework makes no attempt to explain further how learning takes place; rather it employs psychological learning theory to justify the one critical aspect of the model. Empirical support for the ALT model tends to provide additional evidence of the validity of these theories.

The large majority of contemporary studies on teacher effectiveness are based on a process-product paradigm that defines inquiry in terms of relations between teacher classroom behaviors (processes) and measures of student learning outcomes (product) (Doyle, 1977). The BTES study has one major modification in that the measure of engaged learning time (ALT) is used as the "product." But the approach is still an attempt to develop a prediction formula like that described in detail by Gage (1963). Rosenshine (1971) described the basic stages of such studies as:

> (1) the development of an instrument which can be used systematically to record the frequency of certain specified teaching behaviors; (2) use of the instrument to record classroom behaviors of teachers and their pupils; (3) a ranking of the classrooms according to a measure of pupil achievement adjusted for initial difference among the classes; and (4) a determination of the behaviors whose frequency of occurrence is related to adjusted class achievement scores (p. 18).

The process-product paradigm contains no explicit explanatory principles to guide the selection of variables or the interpretation of results. This is true even though specifying functional categories of teaching behavior and the causal relationships between them could lead to explanatory principles. Nor does the two-factor structure of the paradigm incorporate variables linking teacher behaviors to student outcomes, which might contribute to an explanation of how teacher effects occur. Although it is true that ALT is conceptually seen as an interim variable that links teacher behavior to achievement, the BTES staff did not treat the data in that way.[8] Furthermore, since the determination of relationship between process variables and product has taken the form of statistical formulas, any number of variables can be inserted into the equations. The selection of variables has usually been on either empirical criteria–the magnitude of correlation coefficients–or on personal preferences, rather than from some explicit theory of teaching. The 14 teacher behavior variables used in this study clearly were derived from a combination of empirical information and preference.

The fitting of the teacher behavior variables into the "diagnostic-prescription" framework follows the medical analogy prevalent in current educational writing.[9] Anglin (1976) describes this pedagogical procedure as follows:

> The curriculum is a dispensary from which students receive medical treatments under the everpresent direction of a competent and proficient general diagnostician. Each patient has unique and varying ills, but the diagnostician, using precise and scientific diagnostic techniques, prescribes the proper and unique medication. Many of the remedies, conceptualized and developed by specialists, are self-administered with intervention needed only when rediagnosis and represcription are deemed necessary or therapy seems in order. Through the carefully conceived medical strategem designed from a systematically derived prognosis, a treatment program is developed, void of cultish cures, which will allow each patient to mature to his fullest potential (p. 63).

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[8] See footnote 3.

[9] Some writers who use the terms "diagnosis" and "prescription" claim not to be following a medical analogy. However, the meanings for the terms as used in education have their roots in the doctor-patient relationship (see Shrag, 1971).

The implications of such an analogy, of course, is that teaching behaviors should have an aura of precision and scientific respectability. Diagnosis-prescription also implies an episodic sequence for teaching behaviors. However, again the BTES teaching data were not examined from that perspective.

In summary, the ALT framework assumes a unique place in the literature on exposure to schooling, on learning, on teaching behaviors, and on instructional research, because it attempts to relate these often dissimilar lines of inquiry under one all-encompassing framework—and the key link is the conception of Academic Learning Time.

Findings

It is my intent in this section to acquaint the reader with the general findings and their interpretation related to the question, "What impact do teaching behaviors have on academic learning time and student achievement?"

However, before I attempt to answer this question, let me assure the reader that the BTES staff claim:

1. Academic learning time is *positively* associated with student achievement.
2. Low success rate is *negatively* associated with student achievement.

Given these major findings, I have chosen to summarize the vast set of data analyses to answer the above question by describing the relationships between the 12 teaching variables and ALT, low success rate and student achievement for reading and mathematics at both second and fifth grade.

The relationships for the three *diagnosis* variables were neither strong nor consistent. Item prediction best represented the domain of teacher diagnosis. The teacher was asked to estimate which items of a selected set from the BTES achievement battery the student would answer correctly. When teachers were more successful at this task, their students tended to perform better on tests. To some extent item prediction can be viewed as one measure of how well the teacher knows what the students can or cannot do. This task presumably requires both knowledge of subject matter, to analyze test items, and awareness of differences between students, to know who can do what. The other diagnosis measures, knowledge of subject matter and differentiated perceptions, tend to follow along with item prediction in relationship to achievement; but the relationships are less strong. The BTES staff concluded: "The teacher's ability to diagnose student skill levels was related to student achievement and academic learning time" (Fisher et al., 1978, p. 12).

They believe the evidence, although not always consistent, suggests that diagnostic ability probably relates to student achievement by working, in part, through student academic learning time. The teacher's diagnostic ability was negatively related to low success rate (that is, the better the teacher was as diagnostician, the less likely he or she was to prescribe materials that were too difficult). The diagnostic ability of the teacher was also positively related to ALT. Among teachers in this sample, the better diagnosticians generally were associated with students with higher engagement rates.

The relationships for the three *prescription* variables with the three outcome measures were not consistent among grades and content areas. Only at grade five, when responsiveness to need was combined with flexibility, was a consistent pattern found with respect to ALT, but not with achievement.

For the three presentation variables, two were associated with ALT. First, explanation-need was negatively associated with ALT. Students with less ALT receive more explanation based on need Explanation-need is consistently and positively associated with low success rate.

One interpretation is that these results validate the definition of the variable. Students receive explanation-need when they need it, when they are still making mistakes and do not fully understand the material. One would hope, of course, that explanation would be given in a manner timely enough to reduce overall confusion and increase the percentage of the time coded as high success rate. Such a situation would produce a positive correlation between explanation-need and low error rate and a negative correlation with high error rate. But this is not what happened. The interactive teaching behavior explanation-need is a response to a problem. It attempts to remedy misunderstanding. It does not, relative to other patterns of instruction, produce superior understanding.

A second presentation variable, structure-direct, is generally and positively related to ALT. Tasks are more often coded "easy" for students who frequently receive task structuring or directions from the teacher. Structuring apparently helps the child recognize the task and recall the knowledge needed to perform the task. Providing direction may help avoid errors due to task format. The student might have a basic understanding of the content but would still make errors on a task because he or she does not follow specific task requirements. Giving directions would reduce this type of misunderstanding.

The two monitoring variables, academic observation and academic questioning, were combined to form the single variable, academic monitoring, since academic observation by itself was coded infrequently. For that variable and the two feedback variables two strong relationships seem apparent. First, academic feedback has a clear effect on achievement. Students achieve more when they receive more feedback about the correctness of their answers.

Second, task engagement feedback produces significant but conflicting relationships. With ALT the pattern of relationship is mixed. In math, task engagement feedback is negatively correlated with ALT, a finding that seems to make sense. Task engagement feedback is primarily negative and tends to occur in response to off-task behavior; as such, task engagement feedback would occur more often for students with less ALT. Also, low success rate is positively associated with task engagement feedback. Students for whom some tasks are coded low success receive more task engagement feedback.

After examining these somewhat mixed results, the BTES staff combined "explanation-planned," "explanation-need," "academic monitoring," and "academic feedback," into a more global variable labeled "substantive interaction." After reexamination of the data they concluded:

> More substantive interaction between the student and an instructor associated with higher levels of academic learning time (Fisher et al., 1978, p. 16).

Substantive interaction between teachers and students consisted of presentation of information, monitoring of work, and feedback about performance. Most student-teacher interaction took place in a group setting, with only a small part of such interaction occurring during seatwork as a one-to-one "tutorial" encounter. When group time was characterized by high levels of substantive interaction (as opposed to organizational tasks or waiting for others), engagement rates were higher. When students received more contact with an instructor during seatwork, engagement rates were higher. Engagement rates were especially low when students spent two-thirds or more of their time in seatwork and had little interaction with an instructor. Thus, this finding has implications for class size, individualized instruction, use of aides, and other grouping practices. Those allocations of resources and organizational arrangements that allow for more substantive interaction between adult and student will be preferred because of the positive association of substantive interaction with student engagement.

In summary, the BTES data provide substantial evidence that what teachers do influences academic learning and, in turn, student achievement.

Critique and Implications[10]

The purpose of this section is to outline the principal limitations of the BTES framework of teacher behaviors. Drawing attention to these problems should not detract from the importance of the ALT framework. Instead it is the intent that future efforts be directed to adapting or expanding the model to encompass some of these problems.

The BTES ALT model is an important step toward understanding the process of student learning within our schools. The model possesses the unique and attractive feature of relating institutional and teacher characteristics to achievement through the intervening variable of pupil activity. This teaching behavior framework suggests several new research questions regarding the way behaviors of teachers within the classroom determine student opportunities to learn. Thus, it is also the intent here to suggest directions for future research.

Limitations

The limitations of the BTES ALT framework can be summarized at three levels—theoretical, framework, and operational details.

At the theoretical level, the ALT model encompasses the basic limitations endemic to the theoretical ideas on which it rests. First, the process-product paradigm is only loosely related to any macrotheory of society and the purpose of schools. The model assumes there is some desirable product, but who decides what is to be learned and for what purpose is not addressed. Thus, it is imbedded in a deterministic conception of society. Information based on such a paradigm could be used to foster either good or bad aims. Second, Doyle's (1977) critical analysis of the details of this paradigm points to problems that hold true for the ALT model. The paradigm is rooted in a two-factor structure, which attempts to produce "laws" that specify teacher behaviors that causally affect student outcomes (usually determined by linear regressions). Such an approach focuses on what teachers do rather than how children respond, on the teacher's role in learning to the exclusion of the role of the student and the role of his/her peers, on frequency and stability of teacher actions rather than appropriateness of actions within a teaching episode, etc.

The BTES ALT model conceptually departs from the process-product paradigm by making engaged time the dependent variable (and a mediating variable between teaching and achievement). However, frequency of teacher actions still is used to predict that pupil outcome. For a more complete discussion of these issues, see Doyle (1977), Berliner (1976), Brophy and Everton (1976), Duncan and Biddle (1974), and Gage (1978).

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[10] Readers who wish to review the principal findings of the BTES research are referred to the preceding chapter by Fisher, et al.

The central notion of academic learning time (ALT) is conceptually grounded in Carroll's (1963, 1973) model of learning. But "learning" in his model is influenced by both "time spent" and "time needed," which in turn are influenced by five specific factors: time allowed, perseverance, aptitude, ability to understand instructions, and quality of instruction. Unfortunately, only time allowed and time spent are well addressed in the ALT model. Also, relevant tasks, as part of how engaged time was estimated, must be considered as a proxy for quality of instruction. However, few curriculum theorists would accept it as a good indicator of quality. Failure to consider the other factors and their influences on learning is a serious limitation.

Although the diagnostic-prescriptive framework used to identify teacher behaviors is currently popular, the inherent limitations of translating the analogous medical doctor-patient relationship into teacher-student has been well documented (in particular see Schrag, 1971). For example, if a patient has a sore throat, both doctor and patient are aware of the problem. The patient knows what it is like to be well and wants to be well. The doctor's job is to prescribe a procedure among alternatives for the patient to follow to regain health. In teaching, the student may not be aware of a learning need. For example, s/he has never known how to solve a quadratic equation or what it is like to solve one, nor may s/he want to learn. Thus, the teacher's job goes well beyond that of a simple diagnosis-prescription link. Furthermore, in the literature on teaching, Kliebard (1972) has identified three metaphors, other than the medical analogy, to describe the role of teachers in school. One way of summarizing these ideas is to use Romberg's (1974) adaptation of Perrow's (1969) organizational theory to explain social types.

Perrow identified two dimensions that underlie most organizations. The first is related to the assumption one makes about the uniformity of raw materials entering the organization. Thus, in schools, students may be assumed either to be uniform or variable in terms of capability. The second dimension relates to the assumption one makes about how well the process for transforming this raw material into a finished product is understood. For schools, this means how well the instructional process is understood (see figure 3.3). The traditional school is a highly routine organization, where it is assumed that the nature of the learning process is well understood and students are perceived as uniform. Its historical roots in the United States can be traced to the beginning of the 20th century, when mass education was initiated (Cremin, 1964). The bureaucratic school organization was seen as a means of organizing and controlling educational

Figure 3.3 Four School Types

	Students		
	Uniform	Variable	
Nature of instructional process	Academy school	Clinical school	Not well understood
	Traditional school	Systems school	Well understood

Source: Romberg, 1974.

enterprise. The curriculum in a traditional school has been metaphorically described by Kleibard (1972) as a means of production where the student is the raw material, which is transformed into a finished and useful product under the control of a highly skilled technician. In the clinical school, the nature of the learning process is perceived as not well understood, with few, if any, well-established instructional techniques for ensuring success. The curriculum in this school can be described as the greenhouse where students grow and develop to their fullest potential under the care of a wise and patient gardener (Kliebard, 1972). The academy school assumes that little is known about the nature of the instructional process; therefore, teaching is more art than science. Yet students are considered to present uniform problems that the teacher must address. The curriculum in this school is a route over which students travel under the leadership of an experienced guide and companion (Kliebard, 1972). In the systems school it is assumed that the nature of the instructional task is well understood, but children are considered to have a wide range of abilities. The curriculum in this school is a dispensary from which students receive medical treatments under the ever-present direction of a competent and proficient general diagnostician (Anglin, 1976). Although all four school types and corresponding metaphors have serious limitations, picking one at the exclusion of the others is unwarranted. Eventually, a comprehensive theory of teaching must evolve to encompass the appropriate characteristics of schooling derivable from each perspective.

At the framework level, one specifies the particular major components (such as prescription, feedback, or pupil actions) and how they are related.

The major limitation of the BTES ALT framework at this level is a matter of omission. To simplify the complexity of classrooms, certain factors are selected and others omitted. Future efforts to look at the teaching-learning process based on the ALT model must attend to factors omitted from the model. In particular, four omissions seem to be readily apparent. First, quality of instruction as posited by Carroll is not included, but it could be approached from a curriculum content perspective and then used to define relevance. The curriculum plan and the activities the teacher has decided on, rather than test items, should be used to define relevance. Second, scaling of teacher activities should be derived from a notion of instruction that attempts to capture the episodic nature of teaching. Frequency of behavior is less important than timing. The *number* of explanations given is not as important as *when* an explanation is given. A weighted or Boolean scaling procedure needs to be included so an index of appropriateness of teacher behavior can be used. Third, no motivational factor is explicitly included in the model's diagnostic-prescriptive framework. Assessment of what teachers do to motivate students and whether students are indeed motivated should be included. Finally, of particular importance is the documented effect of peer influences on the learning process. Social relationships are one of the central concerns, as children's desire to attain or maintain membership in a clique or reference group motivates many of their behaviors. This need for social affiliation can dramatically affect students' efforts to learn, hinder teachers' efforts to instruct, and affect the way children and their instructors spend their time in school. If the model is to be a realistic representation of the learning process, the powerful variable of peer influences must be incorporated into the conceptual scheme. With these and undoubtedly other changes a more dynamic model could be created.

At the operational details level, a number of improvements could probably be made in the construction of variables. I will not attempt any detailed criticism of these operational decisions, since at the time the decisions were made they seemed reasonable in terms of the intellectual and financial resources available to the BTES staff.

In summary, the BTES ALT framework and the study based on that framework are important contributions to the study of teaching. The limitations I have outlined should alert researchers and educators to the next steps that need to be taken.

Since learning is a process that develops in time, a subsequent model should be one based not only on the ALT ideas, but also on an attempt to explain learning and predict outcomes in a dynamic sense. Only in this way can complex relationships among the several relevant influences on students be illustrated. The creation of a comprehensive theoretical model of teaching and learning, formulated as a dynamic causal process and tested on high quality longitudinal data, remains a long-range goal of researchers and educators.

Implications

I am concluding this chapter with a few comments about implications of the ALT framework for researchers, school administrators, teachers, teacher trainers, and educational policymakers. The model's principal value is heuristic: by focusing on pupil activity it should draw educators' attention to new questions.

For researchers, the challenge is to clarify how institutional characteristics of schools influence pupil activity engagement in a dynamic sense. In particular, although the BTES staff members have made a significant contribution in restricting their conceptualization of teaching behaviors to five generic teaching functions, researchers should attempt to examine, clarify, extend, and falsify these functions as part of a causal model of instruction.

For school administrators, the challenge is related to their actions and procedures to increase student engagement. In particular, there is a lot of anecdotal information about school operating procedures, such as scheduling, wait time, and loudspeaker announcements, that detract from engagement. Also, pupil engagement potentially could be used as a criterion for evaluating teachers. Clearly, some teachers are better at getting and keeping pupils on task than others. Before this could be done, however, some decision would have to be made about the *quality* of engaged time.

For teachers, the challenge is to judge their own activities with respect to how well the activities keep students engaged, to observe more closely whether students are engaged, and to adapt their behaviors accordingly.

For teacher trainers in both preservice and inservice programs, the challenge is to rethink the content and emphases of current courses and programs. The BTES work has shown that one important aspect of teaching is resource management: in particular, managing time. Programs of the future must include this important component.

For educational policymakers, the challenge is to analyze policy issues in terms of implications on pupil engagement. Also, since there is a finite amount of time to be allocated to instruction, the BTES work should force policymakers to reconsider the purposes of schooling and the social needs that schools can reasonably accommodate. The numerous demands on schools to include greater content cannot be met unless other content is eliminated.

In conclusion, the BTES staff has reformulated the problem of how to study teacher effectiveness by changing the focus from factors associated with achievement to factors that maximize students' engagement during instruction. This essential big step forward now needs to be continued.

4

Success Rate

James H. Block

American public education is currently experiencing unparalleled external interventions into its internal matters. School personnel in about three-quarters of the States are facing legislative mandates to "clean up their act." Typically, these mandates take the form of demands for minimal proficiency or competency testing (Pipho, 1978): educators are charged to test students for particular "proficiencies" or "competencies" prior to promotion or graduation. And occasionally the mandates take the form of demands for competency-based education (Spady, 1977): educators are charged not only to test all students for competency but to teach them for competence as well.

At the heart of the thinking that has led to these external interventions has been the concept of failure rate. Public school students seem incompetent to many outside observers, and the problem appears to be getting worse. If these interventions are to be stemmed, therefore, our public schools' failure rate must be cut.

This chapter considers one simple approach to the accomplishment of this purpose—a variable that BTES researchers have called success rate. The chapter describes the variable and some of the major BTES findings pertinent to it. Then it indicates several of the most salient educational features of success rate.

Let me be clear from the outset. I intend to take a positive stance on the value of the success rate variable for current educational thinking and practice. Indeed, in some cases my stance is apparently even more positive than that of the BTES researchers themselves.

I take this positive stance not because I am a BTES insider; in fact, I am an independent outsider and one who has several substantive reservations as to the long-term motivational, or should I say *un*motivational, implications of the success rate findings. I take the stance because of a current malaise or pessimism in the field of educational research that has excluded many useful theoretical developments from reaching the field of educational practice. The success rate variable and findings, to my mind, have many educational insights to offer the practitioner. I leave to others the easy task of documenting what is *wrong* with them; I intend to tackle the harder task of exploring what is *right*.

A Definition and Some Findings

"Success rate" is one of several variables comprising a measure that BTES researchers call Academic Learning Time, or ALT for short. Specifically, "success" relates to the appropriateness of the academic learning tasks on which the student spends engaged time.

BTES researchers defined three "success rates" at which students can spend time in the classroom: a *high* one where the student spends time on tasks that s/he finds very easy and can readily master; a *moderate* one where the student spends time on tasks that s/he finds somewhat easy and can partially master; and a *low* one where the student spends time on tasks that s/he finds very hard and can hardly master at all.

The BTES research suggests that all three rates affect students. The high rate, and in a more uncertain extent the moderate one, have a positive impact on student learning, whereas the low has a negative impact. The high rate also has a positive impact on student attitudes toward the subject matter learned and toward school.

Moreover, the research results suggest that success rate can be controlled by the teacher through the routine execution of certain generic activities. One such activity I would label diagnosis: the accurate prediction of each student's future performance based on her or his present and past history. Another I would call prescription: the provision of appropriate learning tasks for each student based on the teacher's diagnosis. A third I would term orientation: the clarification of each learning task for each student in terms of what is to be learned and how it is to be learned. The fourth I would designate feedback: the provision of constant information to each student regarding learning progress. The fifth I would name correction: the provision of timely supplementary instruction for each student whose learning progress is insufficient.

Some Features

Now that we know what success rate is, let us consider five of its most interesting features. We can label them as follows: Success rate is a *quality of learning time* variable; a *success* variable; a *rate* variable; a *manipulable* variable; and a *mastery learning* variable.

Quality of Student Learning Time Variable

One interesting feature of the success rate variable is that it is a quality of student learning time variable. Whereas the other components of ALT (namely, allocated time and engagement rate) attempt to index the quantity of time that students spend actively engaged in learning a particular subject, success rate attempts to index the quality of that time. Specifically, it taps what students are actually doing during their engaged academic time. What BTES researchers are saying through the variable is that educators can indeed help students to learn better by finding *more time* for academic matters. We can have even more impact, however, if we find more time for *more appropriate* academic matters.

This message is refreshing in two respects. First, it helps to redress a current imbalance in educational thinking regarding the role of time in student learning. The great bulk of this thinking has concentrated on manipulation of the quantity of time that students spend in learning (see, e.g., Borg's chapter). Manipulation of the quality of that time has been little examined despite evidence that the quality is just as important as the quantity (see, especially, Block and Burns, 1977; Proceedings of the NIE Invited Conference on School Organization and Its Effects, 1978).

Second, the message challenges educators to rethink not only what they teach but also how they teach it. Historically, we have tended to design our academic curriculums and instructional methods so they were educator-appropriate. This meant that many learning tasks were irrelevant from the students' perspective (Bloom, 1976) and were taught as if students were already experts (Glaser, 1973). The BTES success rate findings strongly suggest that we must pare our current academic curriculums and instructional methods so they are more learner-appropriate. We must strive to ensure that virtually all of our learning tasks are as relevant as possible from the students' perspective and to remember that our students are novices.

Success Variable

A second intriguing feature of the success rate variable appears in the first part of the label itself. Success rate is a success variable. What the BTES researchers are saying through this variable is that if educators want better learning and better learner feelings, then they ought to offer students more learning success and fewer learning errors. Indeed, as if to emphasize this point, they even changed the variable's label from "error-rate" in the earlier technical reports to "success rate" in the final ones.

This focus on success is noteworthy because it places the BTES researchers squarely in the camp of a growing group of educators who optimistically believe that schools can make a positive difference in most students' intellectual and emotional growth. These educators take the view that each student can learn well if s/he is taught sensitively and, hence, that no student need make learning errors. Consequently, they contend that our public education systems ought to provide relatively error-free, preventive learning environments for each student rather than error-full, infective ones. Since an error-free learning environment is a successful one, they press, in short, for schools designed around the idea of learner success.

At first glance, it may seem strange that any modern educators must press for this idea in the design of public school learning environments. The idea is, however, relatively new in terms of public education planning. Historically, public schools in the United States have been built on the assumption that not every student can learn well and, hence, many students must make learning errors (Bloom, 1976). Accordingly, schools were designed to allow these many error-full learners to distinguish themselves from their few error-free peers. Most students, rather than being given chance after chance in our public schools to demonstrate learning success, were given chance after chance to demonstrate learning mediocrity or failure. What better way to find a few error-free learners than to give the many error-full ones ample opportunities to reveal their flaws?

It has only been in recent years that education researchers have begun to understand fully the costs of such error-promoting systems of public education. Several scholars have found them to be intellectually and emotionally pernicious to many students. Bloom (1976), for example, has documented how they inhibit students' academic and personal development. Indeed, his work suggests that most students in such systems leave school not only unable but also unwilling to undertake the lifelong learning required to maintain a decent standard of living (Block, 1971a). And other scholars have found error-promoting systems to be equally pernicious from the standpoint of many teachers and administrators and the communities they serve. Consider school staff morale: I have observed such systems bar many teachers and administrators from the chance to attain perhaps their most prized professional reward; namely, the knowledge that they are making a difference with students. Then, I have watched these systems make the teachers' and administrators' professional lives more demanding to boot. Such educators must give special attention to a wider range of learner management problems. They must, for example, "individualize" their instruction in the face of unnecessarily wide ranges of individual differences in students' readiness to learn. This typically entails redoing portions of their predecessors' jobs as well as trying to do their own.

Consequently, it has only been in recent years that some educators have called for replacing error-promoting systems of public education with error-preventing ones. These educators feel that the latter systems liberate most students intellectually and emotionally, since they focus on developing talent in all learners rather than on identifying the lack of talent in most learners. Bloom (1976), for example, writes:

> the educational system can be a self-correcting system so that errors made at one time can be corrected before they are compounded with later errors.
>
> In effect, a self-correcting system of schooling can become a minimal-error system of education (insofar as learning errors may be reduced as they occur) with consequent positive effects on students' affective and cognitive characteristics.... We have made the point that much of individual differences in learners are the effects of a system of schooling which is full of errors. A minimal-error (or error-correcting) system of schooling may approach the effectiveness for learning of a system of tutoring in which a highly gifted and sensitive tutor interacts with one student at a time (pp. 211-212).

These educators also see the error-preventing systems as being equally liberating for teachers, administrators, and the communities they serve. For example, such systems are viewed as one way to improve school staff morale. Exemplars of such systems, such as mastery learning strategies, give staff members the opportunity to have a consistently positive impact on their students (Block and Burns, 1977). Thus, they make educators' professional lives more rewarding while at the same time helping them to face the demands of their jobs better. For example, at a time when teachers and administrators are increasingly asked to be "accountable" for student learning, such systems can provide practitioners with the tools needed to discharge the responsibility (Block, 1973; 1977).

Rate Variable

A third noteworthy feature of the success rate variable appears in the second half of the label. Success is a *rate* variable. What the BTES researchers are saying to us educators is that if we want to produce a generation of truly learned students, then the learning student cannot experience success at only a few milestones in her/his career. Each must experience a constant stream of success.

This rate conception of success is interesting primarily because it is so alien to the way success is currently distributed in the schools. Even educators who want students to experience success allow them to do so only periodically. For them, success is like sainthood, something one earns only if s/he has been very good for a long time.

Consider, in particular, common grading practices: even the best students are given only intermittent feedback about the success of their learning. First, they are socialized to believe that all that counts is public indication of how well they have learned relative to their classmates. Then they are given only periodic public opportunities to distinguish themselves from their peers. And finally, they are told that even these opportunities count only partially. What really counts are their final grades! Thus, it is only after an entire quarter, a semester, or, in a few cases, an entire year that even the best students know where they stand.

The BTES researchers' rate of conception of success clearly challenges this ascetic mentality on rewarding success in public schools. The success rate variable encourages educators to provide continual rather than periodic feedback to students about the excellence of their learning. And, just as important, it encourages them to couch this feedback in terms of the material to be learned. It helps the student understand that success is not an external concept, dependent on the learning of others, but rather that it is a more internal concept, dependent on one's own learning. The student can, therefore, earn success any time s/he chooses; s/he need not wait for a special competitive time the teacher chooses.

Manipulable Variable

A fourth interesting feature of the success rate variable is that it is manipulable. In particular, the variable is educator-controlled. What the BTES researchers are saying through this variable is that if educators really wish to promote student intellectual and emotional growth, they have one means readily at hand.

This feature is intriguing because of the mode of educational problem solving it reflects. It might be called the "can do" approach. This approach is based on the assumption that central educational problems can be solved, and that many of the solutions are to be found in educator-controlled variables. One explores how far the problems can be solved through manipulation of these variables before looking for solutions beyond educator control.

Contrast this approach with the currently fashionable mode of educational problem solving—the "can't do" approach. This approach, too, is based on the assumption that central educational problems can be solved; but here the solutions lie in variables beyond educator control. One explores how far the problems can be solved through manipulation of these variables before looking for solutions within the educator's control.

Educationally speaking, the former approach is eminently more reasonable than the latter one. It leads educators to think about problems in soluble rather than insoluble terms. Think, for example, of the plethora of central educational problems that recently have been considered in terms of variables that are essentially beyond direct educator control. It is difficult to peruse educational literature or attend educational meetings without constantly hearing variables such as sex, race, socioeconomic status, the family, or government regulation invoked to explain our educational woes. Recently, for example, I read a *Los Angeles Times* article on the problem of opening admissions to colleges and universities to a wider range of individuals. Essentially the argument advanced was that wealth, race, sex, and geography were the major factors contributing to closed admissions and, hence, the solution for open admissions was for educators to somehow manipulate these variables. Nowhere did the article consider that these variables may be educationally unmanipulable!

The "can do" approach offers educators some hope. As I have crisscrossed the country on professional business, I have noted a distinct sense of powerlessness among educators, a sense that seems to be spreading. I believe this sense will continue to spread as long as educators continue to analyze central educational problems in insoluble terms. The "can't do" approach invariably attributes our problems to exogenous forces over which educators have little power. What hope can they have, then, of doing anything to improve their lot?

Of course, all central problems in education cannot necessarily be *solved* by variables that educators control. But they all can be *conceptualized* in these terms. These conceptualizations can then be tested (just as the BTES researchers have tested theirs) to see how far they go toward solving the problems. My hunch, after a decade of "can do" problem solving in teaching and testing, is that we can get very far indeed.

Consider, for example, the inordinate problems of classroom management and discipline. Suppose that rather than viewing these problems as stemming from forces outside educator control, such as the lack of discipline at home, we thought of them as being caused by forces within our control. In particular, suppose we viewed them as being caused not by the mismanagement of learners at home but by the mismanagement of learning at school. We could then attempt to solve the problem of learner management by using techniques of learning management. Carroll (1971) has listed some of these techniques:

> teaching ought to be a simple matter if it is viewed as a process concerned with the *management* of learning. . . the function of the teacher is to specify what is to be learned, to motivate pupils to learn it, to provide them with instructional materials, to administer these learning materials at a rate suitable for each pupil, to monitor students' progress, to diagnose difficulties and provide proper remediation for them, to give praise and encouragement for good performance, and to give review and practice that will maintain pupils' learning over long periods of time (pp. 29-30).

In my experience, the relationship between management of learner problems and management of learning problems has always been direct, if complex. The fewer learning problems, the fewer learner problems. But one need not take only my word; other scholars have found much the same. As a case in point, the BTES researchers themselves found that high success rate was associated with better attitudes toward the basic subjects of reading and mathematics and toward school.

Mastery Learning Variable

The final interesting feature of the success rate variable may be, practically speaking, its most important one. Success rate is a mastery learning variable. That is, it is a variable that can be systematically manipulated in the classroom using so-called "mastery learning" strategies.

This feature puts at practitioners' feet some readymade and proven means of improving their success rate. They need not waste time building such means from scratch. Moreover, this feature allows them to improve not only their success rate but also the other facets of ALT–that is, allocated time and engagement rate–as well. This is because mastery strategies are systematic approaches to instruction that provide the classroom teacher a framework for orchestrating and executing those five generic teaching behaviors–which I have labeled diagnosis, prescription, orientation, feedback, and correction–that the BTES research has shown to improve ALT and, hence, student learning and attitudes.

Essentially, all mastery learning strategies are designed around the concepts and techniques indicated in figure 4.1. Space precludes a full discussion of the figure, so the following account must suffice. The reader who wishes a fuller account is referred to Block (1971 b), Block and Anderson (1975, 1977), Block and Burns (1977), Bloom (1976), and Torshen (1977).

General considerations. All mastery strategies, whether of the group-based/teacher-paced variety or of the individually based/self-paced kind, are designed to help virtually all students learn as well and as fast as only a few students currently learn. At the heart of these strategies is the view that each student's instruction must be approached systematically.

Systematic instruction for the mastery practitioner entails the building of a bridge between what the teacher wants to teach and whom s/he wants to teach. First, the instruction is matched to the course outcomes the teacher is seeking. This means that the teacher's instruction will be outcome-based. Then the instruction is matched to the specific learners. This means that the teacher's instruction will be multimethod; each student, within some limits, can reach the course outcomes through those methods best suited to her/his learning requirements.

Figure 4.1. **Mastery Learning – How Does It Work?**

Concepts		*Techniques*
General		
A. Approach instruction *systematically:*		Base instruction on outcomes:
instruction should provide bridge between learners and outcomes	→	Provide multiple instructional methods
Specific: Preconditions		
B. Define *outcomes*	→	Define mastery and make it explicit
C. Provide for *appropriate help* in learning	→	Predesign instruction for mastery
D. Provide for *appropriate learning time*	→	Predesign instruction for mastery
Specific: Operating procedures		
E. Provide *student orientation*	→	Orient students to mastery learning
F. Vary *how* and *how long* each student is taught as necessary	→	Teach for mastery
G. Grade	→	Grade for mastery

Specific considerations: preconditions. The mastery practitioner begins by executing a series of activities outside of class. These activities are called the preconditions for mastery learning.

The first precondition the teacher must satisfy is to define the learning outcomes s/he will pursue. Obviously no approach to instruction can be outcome-based if the outcomes on which it is based are undefined.

Outcome definition is a two-step process. First, the teacher defines what course mastery will mean. S/he determines what all students will be expected to attain and at what levels; i.e., the course mastery instructional objectives and mastery performance standards. Second, the teacher makes explicit this definition of mastery. Mastery instructional objectives and performance standards are put on paper in such a way that they clearly communicate to the teacher what must be taught and to the student what must be learned. Typically, the objectives are converted into an appropriate objective-based or "criterion-referenced" (Popham, 1978) course final examination and the standards into final examination scores indicative of excellent performance.

The second precondition the teacher must meet is the provision of appropriate help for each learner. Mastery theory proposes that student learning errors often stem from uncorrected errors made at an earlier time.

So mastery practice attempts to prevent later learning errors by identifying and correcting current learning errors as they occur.

This prevention is accomplished through the predesign of the teacher's instruction. First, the teacher breaks the entire course into roughly 2- or 3-week learning units. Next, s/he hierarchically sequences these units so the material in one unit consistently transfers to that in the subsequent units. Finally, s/he formulates a plan of instruction for each unit consisting of three parts: the original instruction portion indicates how the unit's material will be taught initially; the feedback portion provides a diagnostic progress check on each student's learning from the original instruction; and the correction portion provides a variety of instructional alternatives to the original instruction.

The final precondition the teacher must tackle is the provision of appropriate learning time for each learner. Mastery theory proposes that virtually all students can learn well if they are given enough time to learn. So mastery practice attempts to make sufficient learning time available.

This precondition is also met through the predesign of the teacher's instruction. Typically the teacher proceeds as follows. First, s/he determines how much time is to be spent on the original instruction, the feedback, and the correction for each unit. This is called the allocated time. Then, s/he compares the allocated time with the calendar time available for the course. Finally, s/he adjusts the allocated time to fit the calendar time. Usually, this adjustment occurs in three stages. In the first stage, the teacher borrows time from the later units and adds it to the earlier ones. In the next stage, the teacher uses this borrowed time to ensure that the correction portion of the course's early units occurs in class. This borrowed time will serve to drive home to students the idea that correction of learning errors is important. In the final stage, the teacher decides to use, as necessary, out-of-class time for the correction portion of the course's later units. Essentially, s/he simply plans on assigning the correction portion as homework for those who need it.

Special considerations: operating procedures. The mastery practitioner is now ready to engage in a series of activities in the classroom based on his/her planning outside of class. These activities are called the operating procedures for mastery learning.

Since learning for mastery is likely to be a new experience for most students, the first operational task the teacher faces is student orientation. Obviously, no new instructional technique can succeed if the ground in which it is planted is not properly prepared.

The teacher typically tackles the orientation task as follows. S/he begins by telling students specifically how the course is to be taught; that is, that the whole course will be taught in a sequence of units, that each student is expected to master the material in one unit of the sequence before attempting the next, and that certain feedback/correction procedures will be used, as necessary, to assist students in this enterprise. The teacher then tells students, again specifically, how course mastery will be defined; that is, what the course's mastery instructional objectives and its mastery performance standards are.

The second operational task the teacher encounters is teaching each unit for mastery. Conceptually, this means that the teacher must simply vary how and how long each student is taught according to the unit's instructional plan.

The teacher begins by executing the unit's original instruction techniques. This gives all students a chance to learn from the same method of instruction over the same period of time. For some students, this method and this time are sufficient to master the unit's materials. The teacher then executes the unit's feedback techniques, which provide information as to those students for whom the original instruction and learning time were sufficient and those for whom they were not. For these latter students, the teacher next executes the unit's correction techniques. Each one is given a prescription based on her/his particular diagnostic-progress results. This prescription directs the student to specific alternative methods of instruction whereby s/he might master the material not mastered from the original instruction. Moreover, it indicates where—inside or outside class—the additional learning time required by these alternatives might be spent. The teacher finally indicates when the original instruction for the next unit will begin. Those students who require correction then have the interim to correct their particular learning problems with those instructional alternatives best suited to their learning requirements.

The final operational task the teacher faces is grading. Since students are not formally graded on each unit of the course, they must be graded across all units taken as a whole.

This task is accomplished by grading students against the definition of course mastery set out on the first day of class. Students are assessed as to whether they have or have not attained each course mastery instructional objective to the appropriate mastery performance standard. They are not assessed as to how well they have achieved relative to their peers. Thus, each student's grade depends only on her or his accomplishments and not on the accomplishments of her or his classmates. Moreover, it depends on the same learning conditions that were apparent throughout the course. The student is again in competition with himself and the material to be learned rather than with colleagues. If s/he has consistently won this competition at the unit level, s/he will also win this competition at the course level. The grade will only provide public recognition of what s/he has known privately for some time—"I have learned well."

The mastery learning teacher typically awards only two grades. One grade is indicative of mastery in the student's learning and is awarded to all students who have demonstrated mastery. Often this grade is equivalent to an A, for mastery means excellence, and excellence is not reflected by B's or C's. The other grade is indicative of nonmastery in the student's learning and is given to all students who have not demonstrated mastery. This grade is typically equivalent to an I (Incomplete) for nonmastery does not mean that the student is incapable of demonstrating excellence in learning. It simply means that the student is capable but has not yet demonstrated this excellence.

Summary

This chapter has considered one simple avenue to begin cutting our public schools' high and growing rate of failure. The avenue is a variable that BTES researchers have called "success rate."

The chapter began by describing this variable. It pointed out that success rate is one of several variables comprising a measure called Academic Learning Time (ALT). While the other components of ALT focus on the time students spend engaged in certain academic learning tasks, success rate reflects the appropriateness—high, moderate, or low—of these tasks.

The chapter then summarized some of the major BTES findings pertinent to the variable. In particular, it focused on the positive impact that high success rates can have on student learning and learner attitudes. It also emphasized the fact that success rates can be teacher-controlled through the routine execution of five generic teaching activities: diagnosis, prescription, orientation, feedback, and correction.

Finally, the bulk of the chapter discussed five of the variable's most salient educational features. Specifically, it contended that success rate is a quality of student learning time variable, a success variable, a rate variable, a manipulable variable, and a mastery learning variable. The first feature says to educators that we can indeed help more students to learn better if we find more time for more appropriate academic matters. The second and third features tell us that such matters would be ones from which students experience a constant stream of learning success rather than learning errors. And the fourth and fifth features suggest that we have the power and the means to provide such matters already in our grasp.

These are exciting features, for they give educators some hold on the destiny of our public schools. True, these holds may be small and tenuous, but they are real nonetheless. If we want to maintain some say over the course of public education in this country, we must use every hold we can get.

5

How Time Is Spent in Elementary Classrooms

Barak V. Rosenshine

The Beginning Teacher Evaluation Study provides us with valuable information on how time is spent in elementary classrooms. Some of the major topics are: the average minutes per day which students spend engaged in reading and math activities, student engagement rates in different settings (that is, teacher-led settings versus seatwork) and suggestions on how student engagement rates might be raised. At the same time, BTES and similar studies also help us understand the limitations of increasing engaged minutes in classrooms.

Caution! The results should be read with caution to avoid misinterpretation. The Beginning Teacher Evaluation Study was limited to the investigation of instruction in reading, language arts, and mathematics in second and fifth grades. The students were within the average range—from the 25th to the 65th percentile on the pretests—brighter and very slow students were not included in this study. Although the focus in this study is on basic skills, one should not conclude that the entire day should be devoted to instruction in these skills. Although the focus is on academic engaged minutes, we do not know, as yet, how many minutes are necessary for adequate progress by average, below average, or above average students. These data are intended to describe current practice; they are not intended to *prescribe* teaching methods.

The first suggestion that follows from these results is that teachers and administrators gather data on academic engaged minutes in their classrooms and compare their results with those obtained in the BTES study. If they wish to increase engaged minutes, they might use some of the suggestions in this paper. We are not sure, at this time, what methods will be most successful with different teachers and students, and much can be gained by comparing results from different classrooms.

The following is a summary of the major BTES findings on student engagement:

1. The number of academically engaged minutes is moderately high. The number of minutes students spend actively engaged in academic activities is not as high as one might ardently wish nor as low as some feared. Typically, second-grade students spend 1 hour and 30 minutes and fifth-grade students spend 1 hour and 55 minutes engaged in relevant academic activities in language arts and math each day (or about 40 percent of the in-class time). The most efficient teachers (referred to as the "high teachers" in this report) raise this to 1 hour and 55 minutes in the second grade and 2 hours and 30 minutes in the fifth grade (or about 50 percent of the in-class time). Thus, as compared with the average, students of the high teachers are academically engaged about 25 minutes more per day in the second grade and about 35 minutes more in the fifth grade. If the high teachers are compared with the low, daily differences of an hour in engaged time appear.

   It is possible to interpret the differences between the high and average teachers at least two ways. On one hand, in engaged minutes, the difference between the average and the best practice is no larger than 25 to 35 minutes per day. On the other hand, 25 minutes per day spread over 180 days equals 75 hours a year, and 35 minutes a day comes to 105 hours!

   At present, it is impossible to say whether the average or high engaged minutes per day are adequate, particularly for low-achieving children. What is impressive is that this is the first time such extensive data on engaged time have been available, and these data can serve as a baseline for subsequent studies in different schools and with different types of students.

2. More allocated time does not lead to less engagement. Many educators worry that if more time is allocated to an activity, students will tire and the overall engagement rate will decrease. The results do not support this fear. In reading, there was a positive correlation between allocated time and engagement rate; in math the correlations were about zero. (In each grade, the three teachers who were highest in total engaged minutes were also above average in both allocated time and engagement rate.)

3. Seatwork and students working alone is a dominant pattern. Overall, students spent about 66 percent of their time doing seatwork during reading, and 75 percent of their time during math. Overall, students' engagement rate was 84 percent in teacher-led groups, and about 70 percent when doing seatwork. However, when a great deal of the allocated time is allotted to seatwork

(e.g., 90 percent), then engagement during seatwork drops, especially in mathematics. There was no evidence that the seatwork activities were trivial; indeed, the error rate during seatwork was only slightly lower than the error rate during teacher-led activities. At this time, the data have not been analyzed to determine the optimal distribution of seatwork and groupwork.

4. Some nonengaged activities seem inevitable. Most teachers were fairly similar in the amount of time spent on noninstructional activities such as transitions before and after breaks, housekeeping tasks, and waiting between activities. These activities took about 45 minutes per day.

   Even during time allocated for reading and math, interim activities (turning in and passing out papers, getting books, and waiting for help) occupied about 8 or 9 minutes in all classrooms. All these activities may be necessary because of large classrooms and varied students.

   The teachers with the highest engaged minutes were able to reduce student off-task time (daydreaming, socializing) from the average of 8 minutes per hour to 4 minutes per hour, but they were similar to the average teachers in all the above noninstructional and nonengaged activities.

5. Substantive interaction is related to higher engagement. Substantive interaction (i.e., questions, answers, feedback, and explanations) during groupwork was correlated both with higher overall engagement and higher engagement during seatwork, suggesting that the practice and corrections during groupwork led to more engagement during seatwork. Substantive interaction during seatwork was also related to increased engagement during seatwork. It was not clear, however, whether this substantive interaction came from a teacher making rounds or from aides in the classroom.

6. "Break time" is negatively correlated with student engagement. Break time referred to all time spent in breaks–recess, lunch, and in-class breaks such as unscheduled physical education and leaving class to go to the bathroom. This time was negatively related to engagement. It was suggested in the BTES report that relatively long periods of "play" carry over and disrupt engagement during academic "work."

7. It may be difficult to find more time for academic instruction. These data give the impression that academic time is more constrained than we thought. If teachers wish to find more time for the academic instruction of low-achieving students, where is it to come from? The noninstructional time and the interim and wait

> time during instruction appear to be fairly constant—necessitated by the difficulty of dealing with diverse children and diverse activities. Many educators are reluctant to reduce the nonacademic time in music and art. One alternative may be increasing the school day, another may be diminishing the nonacademic activities for the less academically successful students.

Although at present there is no evidence of "diminishing returns" from increasing allocated time and diminishing breaks (indeed, quite the opposite), the BTES study did not examine the limits of increasing allocated time for different types of students.

How Time Is Allocated in Elementary Classrooms

Let us begin with an overview of how time is allocated in elementary classrooms. Based on their observations, the BTES staff divided the daily classroom activities into three major parts:

- academic activities (reading, mathematics, science, and social studies);
- "nonacademic" activities (music, art, storytime, sharing);
- noninstructional activities (transitions, waiting between activities, class business).

The amount and percentage of time allocated in each major category are presented in table 5.1.

Table 5.1. Time Allocations in Grades 2 and 5

	Grade 2*		Grade 5	
Category	Time	Percent	Time	Percent
Academic Activities	2' 15"	57	2' 50"	60
Nonacademic	55"	24	1' 05"	23
Noninstructional	44"	19	45"	17

*The average time allocated to each category varies a bit in the two grades because of the larger number of "split classes" in the sample of second grade classrooms. In the typical split classrooms, one group of students (e.g., second-grade students) attends school from 9:00 a.m. to 2:00 p.m. while the second group attends from 10:00 a.m. to 3:00 p.m. This splitting does not appear to do any harm; a number of the highest classes in achievement gain were split classrooms. However, this splitting is somewhat atypical. The reader may wish to focus more on the descriptive statistics for the fifth grade, which represents the more typical situation—one where most students attend school between 9:00 a.m. and 3:00 p.m. or the equivalent. (A single table summarizing all these data is presented in the appendix to this chapter, together with the definition of each category.)

The percentages of time in each grade are quite similar. Academic and "nonacademic" activities occupy the major portion of the day. The surprising figure—but surprising only for those who are not elementary school teachers—is the large amount of noninstructional time. This noninstructional time, which did not vary much from teacher to teacher, appears to represent a constant in classrooms as they are currently constituted.

Academic Activities

In each grade, the largest amount of time is allocated to academic activities. A typical second-grade student spends 2 hours and 15 minutes of allocated time per day in academic activities, and a fifth-grade student spends 2 hours and 50 minutes. (See table 5.2)

Table 5.2. Allocated Time in Academic Activities

	Grade 2		Grade 5	
	Minutes	Percentage of day	Minutes	Percentage of day
Reading and language arts	1' 30"	38	1' 50"	39
Mathematics	35"	16	45"	16
Other academic	8"	3	17"	6

The largest activity is reading. A second-grade student spends about 1½ hours daily in reading, and a fifth-grade student spends 20 minutes more (1 hour and 50 minutes).

Students spend less than half as much time in math as they do in reading and writing: 35 minutes in second grade and 45 minutes in fifth grade. Math activities that occur during science and social studies are included in this figure. Other academic activities, namely, discussion and manipulation in social studies and science, occur for 8 minutes a day in second grade and 17 minutes a day in the fifth grade. (Note that when reading or math occurred during social studies or science, the activity was coded as reading or math, not as other academic.)

"Nonacademic" Activities

Almost 25 percent of the in-class time is devoted to "nonacademic" subjects such as music, art, and physical education. These activities occupy an average of 55 minutes per day for second-grade students and 65 minutes for fifth-grade students. (Breakdowns into separate categories were not available.)

Noninstructional Activities

Almost 20 percent of the in-class time is spent in noninstructional activities (waiting after finishing an assignment, nonacademic class business, and transitions between activities, including going to and from lunch and recess). These activities take about 45 minutes per day. Relatively little time is spent waiting between major activities (4 minutes per day) or in nonacademic class business (6 minutes). The majority of this noninstructional time (35 minutes) is spent in transitions.

Discussion

At present we do not know what amount of time is necessary for most students, particularly less academically successful students. This experimental question is a high priority for future study. But if educators wish to increase the amount of time all students or specific students spend engaged in reading, math, music, art, or science, where is this time to come from? One could take time from one activity and give it to another, but these interest groups already claim "their" time is insufficient. Another alternative–diminishing noninstructional time–appears to be difficult to implement because conducting a variety of activities with students who differ from each other in many ways takes a lot of instructional time. One alternative would be to help average teachers increase their allocated time and engaged time to that of the highest teachers in this sample. Yet we do not know if even that much time will be sufficient for the lower achieving students. Another alternative, particularly for meeting the needs of the lowest achieving students, would be to increase the length of the school day.

Academic Engaged Minutes per Day

The major interest, however, is not allocated time but the minutes a student spends directly engaged in reading, math, and language arts. The BTES researchers called this time "engaged minutes" or "academic engaged minutes." There were two major findings in the BTES study:

1. The average daily academic engaged minutes is about 1 hour 30 minutes in second grade, and 1 hour 55 minutes in the fifth grade. In each case this is about 40 percent of the in-class time. The high teachers were about 30 minutes above this figure; the low teachers were about 30 minutes below.
2. The high teachers in each grade not only allocated more time, but their classes *also had a higher engagement rate than average*

> *teachers.* Thus, within the limits of this study, allocating more time in academics did not lead to diminishing returns.

In coding academic engaged minutes, the BTES observers watched six students in each class throughout the day and coded a student as engaged in reading, math, or language arts when he or she was directly engaged in these activities. Engaged students might be attending to a teacher in a group, reading a book alone, writing a composition, or doing seatwork in reading or math. As we shall see in the next section, there were three types of nonengaged activities: interim activities (sharpening pencils, turning in and passing out papers, getting books); waiting for help from a teacher or waiting for a paper to be graded; and off-task activities (socializing, daydreaming, misbehaving). Thus, when students were putting their names on worksheets, or were waiting quietly for papers to be graded, they were not coded as engaged.

Table 5.3 presents information on the average allocated time, engaged minutes, and engagement rate for the three teachers in each grade who obtained the highest total engaged minutes, for all the teachers, and for the three "lowest" teachers. (There were some teachers who had slightly higher engaged minutes in reading alone or mathematics alone, but the high teachers in this table were for reading and mathematics combined.)

We do not know how representative these teachers are of all teachers. It is tempting to assume that the high teachers in these samples represent the best in current practice, but there may be other teachers who are even more effective in obtaining engaged minutes. Since this question cannot be answered until additional studies are conducted, we will assume that the high teachers in these samples are in the upper 10 percent of current practice, recognizing, of course, this assumption may be changed as future results are accumulated.

Engaged Minutes in Second Grade

As table 5.3 indicates, the average students in the second grade were engaged in reading activities for an average of 1 hour and 04 minutes per day and engaged in math for 26 minutes, for a total of 1 hour and 30 minutes of academic engaged time per day. The students in the classrooms of the three highest teachers were engaged about 20 minutes more in reading, about 4 minutes more in math, and about 25 minutes more overall. The high teachers obtained this extra 25 minutes in two ways: their allocated time was higher, and their engagement rate was higher (81 percent compared with 72 percent for average teachers).

The difference in engaged minutes between the average and the high teachers is 25 minutes per day. If this is spread out over 180 days, it comes

Table 5.3 Highest, Average, and Lowest Teachers in Academic Engaged Minutes

	Reading			Mathematics			Total	
	Allocated	Engagement rate	Engaged minutes	Allocated	Engagement rate	Engaged minutes	Allocated time	Engaged minutes
				Second grade				
High 3	1' 45"	81%	1' 25"	35"	82%	30"	2' 20"	1' 55"
Average	1' 30"	73%	1' 04"	36"	71%	26"	2' 06"	1' 30"
Low 3	1' 00"	72%	43"	30"	75%	22"	1' 30"	1' 05"
				Fifth grade				
High 3	2' 10"	80%	1' 45"	53"	86%	45"	3' 03"	2' 30"
Average	1' 50"	74%	1' 20"	44"	74%	35"	2' 25"	1' 55"
Low 3	1' 25"	63%	1' 05"	38"	63%	22"	2' 03"	1' 25"

to 75 hours! It would seem important to conduct experimental studies to help average and low teachers raise their engaged minutes and to determine the effect of this rise on student achievement. But the figure of 1 hour and 55 minutes of engaged time per day may be the upper bound for the most efficient teachers in currently constructed second-grade classrooms. At the same time, it does not appear that students in second grade are being overburdened by large amounts of engaged time in reading and math.

Engaged Minutes in Fifth Grade

The pattern in fifth grade is similar to second grade except that all times are larger because of the longer school day. There were no split classes in the fifth grade as there were in second grade, and there were fewer breaks.

As is shown in table 5.3, the average students in the fifth grade were engaged in reading activities for 1 hour and 20 minutes per day and engaged in math for 35 minutes, for a total of 1 hour and 55 minutes of academic engaged time per day. The students in the classroom of the three highest teachers were engaged about 25 minutes more in reading and 10 minutes more in math, for a total of 2 hours and 30 minutes of academic engaged time per day. As in the second grade, the high teachers achieved this extra 35 minutes of engaged time in two ways: their allocated time was higher and their engagement rate was higher (83 percent to 74 percent).

Again, this figure of 2 hours and 30 minutes per day for the high teachers (or about 53 percent of the in-class time) may represent the current upward limit for engaged time in reading and mathematics activities. If the 35-minute difference between the high and average teachers is multiplied by 180 days, it comes to 105 hours. Again, we do not know how much engaged time is sufficient for different children, particularly for low-achieving children.

Summary of Academic Engaged Minutes

Because it is difficult to remember all the numbers in the preceding sections, a simplified summary is presented in table 5.4.

A major problem in interpreting these results is that we do not know how much time below average, average, or above average students need to make reasonable progress in reading and math. It may be that for low-achieving children 2 hours per day of engaged time is not adequate. Nor do we know whether we can use the actual engaged time more efficiently. These areas are high priority for future research.

Table 5.4. Daily Engaged Minutes in Reading and Math

	Grade 2			Grade 5		
	Total engaged minutes	Engagement rate	Percent of in-class time	Total engaged minutes	Engagement rate	Percent of in-class time
High 3	1' 55"	82%	50%	2' 30"	82%	53%
Average	1' 30"	71%	39%	1' 55"	79%	40%
Low 3	1' 05"	72%	28%	1' 20"	69%	28%

One interpretation of the data in this section is that the average amount of academic engaged time per day is not particularly high. A fully engaged student could complete his daily reading and mathematics in 1-½ hours in second grade and 2 hours in fifth grade. Or, it could be said that students attend to reading and math activities for about 40 percent of a school day.

The three teachers with the highest number of engaged minutes are 25 minutes above the average in second grade and 35 minutes above the average in fifth grade. If these daily differences are aggregated across a school year, the differences are quite high; but we need experimental studies to determine the effect of helping average and low teachers raise their engaged minutes per day. At the same time, these highest teachers may be giving us the natural boundaries of the best of current practice. Additional studies could determine whether teachers across the country are equaling or exceeding these levels.

Does More Allocated Time Lead to Less Engagement?

As we see in the tables above, the engagement rates of the three high teachers–in both grades and in both subjects–were higher than the engagement rates of the other teachers. (Across the entire sample, the correlations between allocated time and engagement rate were about .23 for reading and about –.10 for math.) Further, students of the high teachers spent less time in clearly off-task behaviors such as daydreaming or socializing. Thus, 2 hours of engaged time in the second grade and 2 hours and 30 minutes in the fifth grade did not lead to bored and restless students.

What Were Students Doing When They Were Not Engaged?

During the allocated time for reading and math, what were students doing when they were not engaged? The BTES study coded three types of nonengaged activities during allocated time: interim activities (sharpening pencils, turning in and passing out papers, getting books); waiting for help from a teacher or waiting for a paper to be graded; and off-task activities (socializing, daydreaming, misbehaving). Table 5.5 gives information on how students spent their nonengaged time. For convenience, these are presented as minutes per hour.

Looking at the average, students were not engaged 16 to 17 minutes of each hour allocated to academic activities; conversely, they were gainfully engaged 44 minutes of each hour (or 71 to 73 percent of the time).

Interim and Wait Activities. Looking at table 5.5, we see that for almost all teachers, 7 to 9 minutes per hour of nonengaged time spent on interim activities and waiting appears to be a fact of current classroom life that applies to even the most efficient of classrooms. (The correlations between wait time and engaged minutes or interim time and engaged minutes were quite low, averaging only -.10.) In most second- and fifth-grade classrooms, it takes time to pass out and collect books and papers, and students have to wait for help, corrections, and instructions. Under the most efficient conditions these activities take 7 minutes per hour; under the least efficient conditions, they take 10 minutes an hour. There is little variation across classrooms.

The major difference among teachers is in the amount of student off-task behavior. In average classrooms, this occupies about 8 minutes each hour. The most efficient teachers reduce this by half, to about 4 minutes.

Conclusion. Nonengaged time seems inevitable. In average classrooms, students are not engaged about 16 minutes per hour of allocated time in reading and math; the three high teachers reduce this amount to 12 minutes per hour. In classrooms of both average and high teachers, students spend 8 to 9 minutes in interim and wait time. Thus, the difference between the teachers who had the highest academic engaged minutes and the average teacher was about 4 minutes of nonengaged minutes per hour, and most of this difference occurred because the high teachers reduced off-task time to about 4 minutes per hour. (Remember, however, that the high teachers also had more allocated time.)

Time With the Teacher and Time in Seatwork

What major activities occur during the allocated time? The BTES study gathered data on the amount of time a student spent in a teacher-led (or adult-led) group and the amount of time a student spent in seatwork (table 5.6). Overall, students spent about 30 percent of their time in a teacher-led setting and 70 percent of their time doing seatwork. This heavy amount of time in seatwork occurs because teachers frequently divide a class into

Table 5.5. Nonengaged Time During Reading and Math in Minutes per Hour

	Reading			Mathematics		
	Interim and wait time	Off-task	Total	Interim and wait time	Off-task	Total
			Second grade			
High 3	9"	3"	12" 20%	7"	4"	11" 18%
Average	9"	7"	16" 27%	9"	8"	17" 29%
Low 3	8"	9"	17" 28%	7"	8"	15" 25%
			Fifth grade			
High 3	7"	5"	12" 20%	3"	5"	8" 14%
Average	8"	8"	16" 26%	7"	8"	15" 25%
Low 3	9"	13"	22" 37%	8"	14"	22" 37%

Table 5.6. Time Spent in Teacher-Led Settings and in Seatwork

Grade and subject	Setting	Percent of time in setting	Engagement rate
2 reading	Teacher-led	36	84%
	Seatwork	63	68%
2 mathematics	Teacher-led	27	82%
	Seatwork	73	67%
5 reading	Teacher-led	31	84%
	Seatwork	70	70%
5 mathematics	Teacher-led	24	85%
	Seatwork	76	72%

three or more groups, and if there are three groups in a class, a student can only spend one-third of the allocated time in a teacher-led setting.

As is shown in table 5.6, when students were in teacher-led groups their engagement rate was about 84 percent, whereas during seatwork it was about 70 percent. Although engagement during seatwork was slightly higher in the fifth grade than in second grade—suggesting that older students are slightly better able to work alone—the discrepancy between engagement during teacher-led activities and during seatwork is still large. Thus, although students spend most of their time in seatwork, their engagement rate is lowest in that setting.

These figures illustrate the difficulty teachers have in working with students of different achievement levels. Students' engagement rates are about 15 percent higher when they are in groups supervised by the teacher, but if the teacher only worked with the class as a whole, the lower achieving students would be behind and the higher achieving students might be bored.

Other studies (Stallings and Kaskowitz, 1975; Stallings, 1977; Soar, 1973) have also found that students are more engaged when they are instructed or supervised by a teacher than when they are working alone. Further, the Stallings and the Soar studies have found that teacher time spent working with groups of students is positively and consistently related to achievement gain, whereas teacher time spent working with one or two students is consistently negatively related to student gain in achievement. These negative results probably occur because, when a teacher is working with only one or two students, the remaining students have to work independently. As we have seen, independent work has lower engagement rate.

Currently, the need for students to spend 60 to 75 percent of their time working alone is a fact of classroom life. Whether this percentage can be reduced, or whether instruction can be organized so students are more engaged when working alone, are major areas for future research.

Are Seatwork Activities Trivial?

The term "seatwork" frequently connotes trivial activities–students coloring the figures in a story, working on tasks far below their level of achievement, doing busywork. From two perspectives, the BTES research suggests that this negative picture is not true.

In the BTES study, the specific content of material the students were working on was coded. A special category was created to code material or activities which were "below the level of the test" used in the study. Only 6 percent of the time was material coded as below the level of the test, suggesting that meaningless busywork is a relatively rare event. (The standard deviations were also small.)

Another way the BTES study looked at seatwork was by coding the error rate of students during seatwork. It might be expected that the error rate during seatwork would be lower than the error rate during teacher-led activities; that is, most teachers might place students at their "independent" level during seatwork and their "instructional" level during groupwork. In second-grade reading and in fifth-grade math, the error rate was the same in teacher-led settings and in seatwork; in second-grade math and in fifth-grade reading, the error rate was only slightly lower in seatwork settings. Overall, there was no evidence that the seatwork was particularly easier than work in teacher-led groups.

Thus, although the allocation of a high percentage of time to seatwork is a necessity in current classrooms, the results suggest that seatwork activities are an integral and contributing part of classroom instruction, rather than trivial busywork.

Influencing Engagement During Seatwork

The nature of heterogeneous classrooms and current instruction requires that students spend a large amount of time working alone at seatwork. Yet, as was shown in this study and in many others, students are less engaged when they are doing seatwork than when they are working with a teacher. At least three suggestions for increasing engagement during seatwork emerged from this study:

1. Increase substantive interaction during groupwork.
2. Increase substantive interaction during seatwork.
3. Keep seatwork time as low as possible.

Substantive Interaction During Groupwork

Given the higher engagement during groupwork, it is not surprising that the amount of time students spent in groupwork had a correlation of .31 with their overall engagement. But the substantive interaction which took place—explanations, questions and answers, and feedback—was an even stronger predictor of overall engagement, yielding a correlation of .45. In other words, although having students in teacher-led groups is positively related to student engagement, it is even better to use this group time for asking questions and giving feedback.

Other studies have shown that the frequent use of short, factual questions is positively correlated with gain in achievement, whereas other types of questions are often uncorrelated or negatively correlated with gain in achievement. It is thus suggested that explanation, asking frequent, short, factual questions, and giving feedback is the type of substantive interaction which is related to overall engagement.

The momentum of substantive interaction. Substantive interaction during groupwork not only is correlated with higher engagement during teacher-led activities, but it is also positively correlated with student engagement during seatwork, particularly in reading. The BTES authors suggest that using most of the time during group lessons for substantive interactions creates a sense of purposefulness, and students then apply this same momentum and efficiency to their seatwork.

Other studies (Rosenshine, 1978) have found that teachers with a strong academic focus in their classroom had students with higher gain in achievement. An emphasis on substantive interactions during groupwork may be another illustration of a strong academic focus.

Substantive Interaction During Seatwork

The data on second- and fifth-grade reading and math can be thought of as falling into four quadrants. In three of the four quadrants, the amount of substantive interaction a student received during seatwork was positively (although moderately) related to student engagement during seatwork. The BTES report presents one dramatic illustration of this finding. In second-grade math, the researchers divided classes that had over 70 percent seatwork into two groups: one group had substantive interaction during 11 percent or more of the seatwork time, and the other group had substantive interaction about 5 percent of the seatwork time. (Note that even "high" amounts of substantive interaction during seatwork are relatively small.) The engagement rate in the high interaction classes averaged 71 percent, whereas the engagement rate in the low interaction classes averaged 61 percent.

Unfortunately, the current analyses of the data did not answer a number of questions about seatwork, although these questions will be explored in the forthcoming secondary analyses of the data. Thus, we do not know the optimum proportions of seatwork and groupwork. The amount of time in seatwork may be dependent on the number of instructional groups a teacher has. In this study, the *minimum* amount of time spent in seatwork was about 35 percent of allocated time. This 35 percent might be seen as the natural lower limit, although we do not know if it is the optimal percentage.

Decreasing Time in Seatwork

The BTES results suggest that in mathematics, increased time in seatwork tends to be negatively associated with engagement. That is, a class with 90 percent allocated time in seatwork frequently has a lower engagement rate than a mathematics class with 60 percent allocated time in seatwork. This may occur because seatwork in mathematics frequently consists of doing a large number of computational problems without immediate feedback, and the longer this goes on the more restless students (and adults) become.

Overall, substantive interaction during groupwork and during seatwork is related to higher engagement during seatwork, and in mathematics increased allocated time to seatwork is associated with diminishing returns. One caution, however; these are correlational results and need to be replicated in experimental studies.

How Do Breaks and Transitions Affect Engagement?

We have sometimes thought that if students had more breaks, they would be more engaged the rest of the time, and engaged minutes would increase. Unfortunately, the current correlational data do not support this argument.

One of the categories, "wait time," refers to time between instructional activities; it can also include time when a teacher is working with a few students and the others have finished one activity and are waiting for a new activity to begin. Although student wait time averaged only about 4 minutes a day, in the second grade, wait time was negatively correlated with student engagement rate in both reading and math. The negative correlations suggest that for second-grade students such waits do not constitute a refreshing break, and that the distraction which occurs during a wait transfers to less engagement during subsequent reading and math periods. These negative correlations did not occur for the older, fifth-grade students.

"Break time" was negatively correlated with engagement in both second and fifth grades. Breaks include recess, lunch, and in-class breaks such as unscheduled physical education and leaving class to use the restroom. The BTES staff believes that this suggests that relatively long and/or frequent breaks may establish a pattern of student "play" that carries over into periods of academic "work," resulting in lower rates of work engagement. This finding seems similar to the previous one on substantive interaction: those teachers who emphasized an atmosphere of work obtained more student engagement during allocated academic time than those who were concerned that students have enough "play." Of course, this does not suggest that effective classrooms were hardhearted sweatshops. Quite the contrary—even in the classrooms with the highest engaged minutes, students were engaged in reading and math activities no more than 50 percent of the in-class time.

Summary

1. Time allocations. About 58 percent of the school day is allocated to academic activities, about 23 percent to nonacademic activities (e.g., music, art, physical education), and about 19 percent to noninstructional activities such as transitions between activities and class business.
2. Engaged time. On the average, students spent 1 hour and 30 minutes (second grade) and 1 hour and 55 minutes (fifth grade) actively engaged in reading and math activities. In the highest classrooms the engaged time was about 30 minutes longer, and in the lowest classrooms it was about 30 minutes less than the average.
3. On the average, students were engaged about 73 percent of the allocated time in reading and math. Teachers with the highest allocated time also had the highest engagement rates (about 82 percent). Thus, within the limits of this study, increasing allocated time did not lead to diminishing returns; quite the opposite, teachers who had more allocated time also had higher engagement rates.
4. During allocated time for academics, students were not engaged about 16 minutes an hour, on the average. Half of this nonengaged time was taken up with interim activities (e.g., passing out and collecting papers) or waiting for help, and the other 8 minutes were when students were clearly off task. Classrooms were fairly similar in interim and wait time, whereas the most efficient teachers reduced off-task time to 4 minutes per hour.

5. Seatwork. Overall, students spent about two-thirds of the allocated academic time in seatwork (or self-paced activities) and about one-third of their time working with an adult. Engagement was higher in teacher-led settings (about 84 percent) than in seatwork settings (about 70 percent). An inevitable fact of classroom life is that if a teacher working alone divides a class into three groups, students will be working alone two-thirds of the time.
6. There was no evidence that seatwork activities were trivial. Seatwork activities were coded as "below the level of the test" only about 6 percent of the time.
7. Increasing engagement during seatwork. The amount of time teachers spent in substantive interaction—explanation, questions, student answers, and teacher feedback—was positively correlated with engagement during teacher-led activities. In addition, substantive interaction during groupwork was positively correlated with engagement during seatwork, suggesting that this substantive interaction creates a sense of purposefulness that students then apply to their seatwork.
8. Student engagement during seatwork increased when there was substantive interaction between teacher and student during seatwork. Such substantive interaction consisted of a teacher (or aide) monitoring seatwork and holding students accountable by asking questions. Such substantive interaction was most effective when it occurred 11 percent or more of the seatwork time.
9. Break time. Break time (recess, lunch, in-class breaks, leaving class to use the restroom) was negatively correlated with engagement in both second and fifth grades. This suggests that teachers who emphasized an atmosphere of work obtained higher engagement than teachers who were concerned that students have enough "play."

Appendix 5.1. Average Allocated Time per Day in Different Activities

Time category	Grade 2 Minutes per day	Grade 2 Combined minutes	Grade 2 Combined percentage	Grade 5 Minutes per day	Grade 5 Combined minutes	Grade 5 Combined percentage
Academic activities		2' 12"	57%	1' 50"	2' 51"	60%
Reading and language arts	1' 28"			1' 50"		
Mathematics	36"			44"		
Other academic	8"			47"		
Nonacademic activities	55"	55"	24%	1' 05"	1' 05"	23%
Noninstructional activities		44"	19%		47"	17%
Transition	34"			34"		
Wait	4"			4"		
Housekeeping	6"			9"		
Major in-class time	3' 51"	3' 51"		4' 44"	4' 44"	
Lunch, recess, breaks	1' 15"	1' 15"		1' 17"	1' 17"	
Length of school day	5' 06"	5' 06"		6' 00"	6' 00"	

Appendix 5.2. General Time Categories

Reading and Language Arts

Reading and language arts refers to all time allocated to reading and language arts any time during the day, including reading and language arts activities in science, social studies, art, and music.

Mathematics

Mathematics refers to all mathematics activities during the day, in all subject areas.

Other Academic

Other academic instruction refers to academic instruction other than reading and mathematics. This includes social studies and science (where there is no reading or mathematics content).

Nonacademic

Nonacademic instruction includes music, art, structured physical education, flag salutes, sharing, and storytime.

Wait

Wait refers to periods of no activity or no movement between activities. This would occur when a student finishes his/her work early and no other activity is initiated. However, waiting for help during reading or mathematics is counted as time in reading or mathematics.

Transition

Transition refers to periods of change from one activity to another. This includes lining up, taking seats, or quieting down before the next activity. However, time spent passing out reading or mathematics materials is counted as time in reading or mathematics.

Class Business

Class business refers to conduct of nonacademic class business such as distribution of notices, collection of milk money, or making arrangements for a field trip.

Break

Break includes any recreational or free period. It primarily refers to lunch and recess breaks, but also includes milk breaks, unstructured physical education, and leaving class to use the restroom.

6

On Learning To Teach Effectively From Research on Teacher Effectiveness

Gary D. Fenstermacher

Like the child who asks where the snow goes after it melts, some may wonder where educational research goes after it is finished. Thirty years ago it went into conference papers, academic journals, monographs, and college textbooks. It still goes there. It also now goes elsewhere, to places with such names as Development, Dissemination, Diffusion, Utilization, and Change. Completed research is sent to these new places presumably to gain an audience which cannot be counted among the primary readership for scholarly and technical publications. Does this search for a different audience mean that development, dissemination, diffusion, utilization, and change are activities devised merely to share research with those not likely to encounter it in the normal course of events?

I think that "no" is the correct answer to this question. Development, dissemination, etc. are formal, sponsored activities, designed to achieve more than the simple imparting of information. Their intended results are described in such phrases as having an impact, changing existing practice, creating and maintaining innovation, and making progress. It is understandable that researchers and their patrons[1] wish to see practitioners advantaged by the fruits of scientific inquiry. What is not obvious is how the nonresearch audience is, in fact, advantaged by development, dissemination, and allied activities.

This chapter deals with the question of how a teacher might be considered advantaged by formal activities intended to link research on teacher effectiveness with effective teaching. There are many ways to build bridges between research on teaching and teacher practices, but only three will be discussed here. They are: (1) rules, (2) evidence, and (3) schemata. As the discussion unfolds, it will become obvious that, were I a bridge inspector, I would condemn bridges built with rules, certify bridges built with evidence, and commend bridges built with schemata.

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[1] The notion that researchers have patrons is taken from Denham (1978).

To make the text a bit easier to read, I shall use the term "bridging" as a stand-in for the more cumbersome "development, dissemination, diffusion, utilization, and change." Developers, disseminators, change agents, and others may reel in horror at this simplification of their life's work and do so with some justification. These activities are reasonably discrete, and hence I treat them somewhat unfairly by squashing them into a single lump. But what remains to be said in this chapter does not demand so fine a differentiation as has become the custom. Bridging, for our purposes, is what one does when bringing completed or near-completed educational research to bear on educational practice—be this practice that of policymaking, decisionmaking, or classroom behavior. The question that guides this inquiry is how bridging may take place so that practitioners are most advantaged by the outcomes of research on teaching. The Beginning Teacher Evaluation Study will be used throughout to illustrate and provide examples for the points to be made.

Bridging With Rules

Rules may serve as the means for bridging educational research and practice. This happens when the results of research are converted to imperatives for teachers to follow. For example, among the findings of Phase III of the BTES is that "more substantive interaction between the student and an instructor is associated with higher percentages of student engagement" (Fisher et al., 1978, pp. 11-14). Loosely restated in the larger context of the BTES, this finding stipulates that a student is more likely to show a gain in achievement of a basic skill if the teacher maintains a reasonably high level of academically relevant interaction with that student. A person engaged in bridging could use this finding as a rule to govern teacher practice. A principal, for example, might ask the school staff to devote not less than half the time available in a given instructional period to teacher-led small group instruction (and do so in the probably correct belief that teacher-led small group instruction is a good way to enhance engagement, but in the questionable belief that half the students in a class constitutes a small group). In taking this action with the staff, the principal is bridging research and practice by converting a finding to a rule and requesting compliance with the rule.

In our modern system of schooling, one need not act very forthrightly to be engaged in rule bridging. A simple request by one in authority can be viewed as a command when directed to a person of less authority. An offer of support contingent upon taking certain steps can have the force of a rigidly applied rule. A veiled suggestion that doing *x* will be a factor in another's evaluation can turn the doing of *x* into a most demanding requirement. In each case there is an expectation that one will modify his or her behavior according to another's interpretation of a research finding. In rule bridging, the recipient of the command is not asked to ponder or consider the research finding itself but rather is asked to behave in ways that take account of the rule formed from the finding.

Bridging with rules brings little if any advantage to practitioners. Some of the reasons why this is so must await further development of the argument. A few of the reasons are accessible now. In general, rules are based exclusively on the findings of research, and not on the research program considered as a whole. There are several faults in an exclusive reliance on findings. The first is the great potential for misinterpretation of the findings. Research findings read out of the context of the entire research effort may be very misleading. Though researchers make careful attempts to delimit their findings, there is simply no practical way to attach all the exclusions, exceptions, and "other things being equal" to each and every finding. A reading of the chapters in this book, for example, reveals many different interpretations of the same findings of the BTES. Second, the findings themselves may be unworthy of great confidence, as would be the case if they were not highly confirmed by the data, or if they were artifacts of the way the data were analyzed, or if they were based on an inadequate or unrepresentative sample. Third, when findings are converted to rules the effect is to generalize the findings to everyone subject to the rule. In many instances, the research simply will not support such pervasive and uncritical generalization of findings. Finally, the rule may be an invalid interpretation of the finding, as would occur if it were shown, in the example above, that teacher-led, small group instruction did not enhance a student's engagement in a task.

Perhaps the most debilitating aspect of bridging with rules is its effect on the practitioner's perception of his or her stature and competence. Persons expected to change their behavior on the basis of rules imposed by others are denied a portion of their freedom to think and act independently. Certainly we must all tolerate a degree of imposition in order to fare well in life. However, if practitioners are to have the opportunity to grow as professionals, other means of bridging research with practice may be far more productive of professionalism than the use of rules. Dewey (1929) recognized the temptation to bridge with rules and cautioned that "no conclusion of scientific research can be converted into an immediate rule of educational art" (p. 19). I believe that Dewey meant that no finding *should* be converted to an immediate rule, for certainly it *can* be done and is, in fact, done regularly.

Bridging With Evidence

Bridging with evidence occurs when the results of research are used to test the beliefs that practitioners hold about their work. A few examples may prove helpful. Mr. Smith, a member of a local school board, argues that too much money is spent on education. He adds, "Teachers make almost no difference whatsoever in pupil achievement; it's all a matter of home background and aptitude." One conclusion of Phase II of the BTES is that "teaching performances make a substantial contribution to what children learn" (McDonald and Elias, 1976, p. 54). This conclusion serves as evidence to test the soundness of Smith's belief. Presented to him, along with other evidence, it may serve as the occasion for changing his mind.

Another example is the case of the teacher who argues that it is perfectly all right for students to make mistakes; "After all, how can you learn if you don't make mistakes?" The teacher who believes this may be quite offhand about preparing assignments for students, thinking that they can always ask questions if they are confused. A finding from Phase III states that "tasks which produce low error rates provide situations where students can rapidly improve their performance and continue to learn as tasks with small increases in difficulty are encountered" (Fisher et al., 1978, pp. 2-6). This finding casts doubt on the adequacy of the teacher's belief about the acceptability of mistakes. It may not always be possible, or advisable, to provide error-free tasks, but the finding suggests that the teacher should be more careful in developing and assigning learning tasks.

In these two examples, the results of research are being used to call into question the objective reasonableness[2] of practitioner beliefs. However, research can also be used to substantiate teacher beliefs. Ms. Rodriguez, a fifth-grade teacher, may believe that the constant interruptions in her classroom caused by public address announcements, visitors, pull-out programs, and a schedule that takes the class from the room three times a day is having an adverse effect on student learning. The Phase III findings, considered in their entirety, lend support to Ms. Rodriguez' belief. Interruptions of a class do affect a teacher's ability to maintain enhanced rates of student engagement in academically relevant tasks. (The preceding chapter by Rosenshine provides a detailed account of how school activities affect engagement rates.) In this example, research findings provide evidence in support of a belief that may have been based solely on personal experience.

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[2] The objective reasonableness of belief is discussed in detail by Green (1971). A discussion of reasonable belief in relation to research on teaching is contained in Fenstermacher (1979).

Bridging with evidence does not require a practitioner to modify beliefs every time research findings are proffered. It requires only that the practitioner weigh seriously the results of the research. To require more would be to place greater confidence in research on teaching than it may legitimately command. Where research findings conflict with beliefs for which there are other reasonable grounds, the practitioner may be justified in choosing to adapt or ignore the conflicting findings. The BTES error rate finding offers an opportunity to explore this point.

The BTES research team found that student learning was increased when students were engaged in tasks that produced a low rate of error; that is, in tasks on which they made few mistakes and these mistakes were the result of carelessness rather than lack of knowledge or understanding. Suppose this finding were presented to a teacher who believes that it is appropriate, on occasion, to assign tasks that students initially find baffling. In taking account of the BTES error rate finding, should this teacher discard his/her belief? I think not.

What I am calling bafflement, Pirsig (1974) calls stuckness. He says, "Stuckness shouldn't be avoided. It's the psychic predecessor of all real understanding" (p. 286). Perhaps students would benefit from experiencing stuckness, learning to deal with it as a productive way into a worthwhile problem. The continuous provision of tasks that produce low error rate, conjoined with such practices as small steps, assured readiness for entry, and controlled successive approximations could provide an inhospitable climate for learning to meet the challenges of independent problem solving. This possibility is based on my observation of the great feelings of insecurity exhibited by college students when they are asked to undertake an inquiry for which the boundaries and the criteria for success will not become clear until they are well into the task. Many students seem almost frightened to get underway, apparently never having had the experience of entering a room full of ideas while the lights were off.

On the other hand, college students are certainly not second- or fifth-grade students learning the elements of reading or mathematics. Perhaps there is a far greater necessity at these lower levels to plan for tasks that produce low error rate. The point seems reasonable enough. Yet my belief about bafflement would moderate my acceptance of the error rate finding. If I were a second-grade teacher, I would choose to spend a modest amount of time introducing students to bafflement, helping them to deal comfortably with it and learn to turn it to advantage. Despite the triteness of the aphorism about not throwing the baby out with the bath water, it fits here. The evidence presented by the error rate finding does not negate my original belief about bafflement; it enlarges this belief. The finding alerts me to the necessity of distinguishing clearly between tasks that produce low error rate and tasks that produce bafflement, and instructs me to consider the differences among students when allocating the proportion of low error rate and baffling tasks. As such, the finding becomes the basis for adapting, but not reversing or discarding, my original belief.

Given this discussion of bridging with evidence, it is now possible to contrast this form of bridging with the use of rules. Rules are imposed with the expectation of obedience, while evidence is presented with a request for serious consideration. Rules are imprecise representations of research findings because their construction requires the rulemaker to interpret the findings; evidence conveys to the practitioner precisely what researchers have learned from their inquiries. To adapt or ignore a rule is frequently regarded as an act of subversion, whereas evidence may be freely and openly accepted, rejected, or modified. The imposition of rules can leave both sound and unsound beliefs equally unaffected, while the consideration of evidence encourages the clarification and assessment of prior beliefs. Bridging with evidence accords the practitioner the status of a thinking, reasoning person; bridging with rules treats the practitioner as if he or she were little more than an automaton. These distinctions drawn, the way is clear to discuss the third form of bridging.

Bridging With Schemata

A schema is "a summarized or diagrammatic representation of something" (American Heritage Dictionary, 1969). Schemata is the plural. Schemata provide a way to "see" a phenomenon and a way to think about it.[3] Bridging with schemata provides a way for practitioners to grasp, in descriptive and explanatory ways, features of their work. The BTES contains several powerful schemata of classroom teaching. Among them is the time schema.

In a fascinating account of the notion of time, Jespersen and Fitz-Randolph (1977, p. 3) contend of time that "we can spend it, save it, waste it, or kill it, but we can't destroy it or even change it, and there's never any more or less of it." This last phrase, "there's never any more or less of it," is true of our generic concept of time. But if we consider how time is used by those who make lesson plans and activity schedules, a different, more elastic perspective on time emerges. The BTES draws a distinction between allocated time and engaged time. The time set aside for instructional activities is allocated time. The time students are actively pursuing academically relevant tasks is engaged time. The notion of Academic Learning Time is an even further refinement. ALT is "time spent by a student engaged on a task on which few errors are produced, and where the task is directly relevant to an academic outcome" (Fisher et al., 1978, p. 2-4). A major finding of the BTES is that ALT is positively associated with student learning. This positive association implies that if a student's ALT is increased, he or she will show a gain in learning. This schematization of time in the BTES suggests that a practitioner can expand or contract the different kinds of time that characterize classroom settings.

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[3] The term "schemata" has also been used by Anderson (1977), but in a manner different from the way it is used in this chapter.

The time schema is a potent one, primarily because many of us are simply not oriented to "seeing" time when we observe classroom events. We have not been alerted to the value of employing our physical senses to detect and measure how time is used in school settings. However, the manner in which time is conceived in the study offers a means to describe and explain what happens in classrooms, with language and concepts not previously available. As Borg and Romberg point out in preceding chapters, many earlier studies of teacher effectiveness looked directly from what teachers did to what students learned. The BTES looked from what teachers did to how students behaved, then related student behavior to student learning. The research team devised the time schema as a means of studying student behavior in the classroom.

The schema contains a number of concepts for classifying and analyzing classroom time: allocated time, engaged time, academic learning time, wait time, break time, and transition time. (The preceding chapter by Rosenshine explains these concepts and describes their use in the study.) In bridging with schemata, these time concepts and their interrelations would be presented to practitioners for the purpose of enabling them to "see" teacher-learner interactions in a temporal dimension. The time schema provides a summarized and diagrammatic representation of selected classroom phenomena. Using the schema, practitioners are able to conceptualize classroom events in ways that clearly relate teaching behaviors to student learning—a relationship that until now has been obscure.

A second BTES schema deals with teaching behaviors. The teacher behaviors schema distinguishes between instructional settings in which students pace themselves and those in which student work is paced by others. It distinguishes teacher planning behaviors (diagnosis and prescription) from interactive teaching behaviors (presentation, monitoring, and feedback) and substantive teaching behavior from procedural teaching behavior. Analysis of the data indicates that some combinations and patterns of teaching behaviors are more productive of student engaged time than other combinations and patterns. On the basis of this analysis, it is possible to link the time schema with the teaching behaviors schema to produce an insightful and suggestive way to look at and think about the connections between teaching and learning. Bridging that imparts both these schemata gives practitioners a means to describe, analyze, and appraise the classroom settings in which they work or over which they have administrative or policymaking authority.

The value of bridging with schemata lies in providing practitioners with the means to structure their experiences with the classroom. Education, in its larger sense, is the provision of means to structure experiences in ways that continually enlarge knowledge and understanding. We all have experiences, but it is extremely difficult to achieve deep and sophisticated understanding from experience alone. It is education that provides us with the means to interpret and evaluate our experience, and to do so in a manner that allows us to become more rational and more moral in our actions. Broudy (1972, p. 82) argues:

> When life predicaments can be resolved with common-sense generalizations, one learns by living; when common sense is insufficient, one has to learn by comprehending knowledge discovered and formulated by others. How far does common sense and personal experience go, these days, in thinking about pollution, inflation, the problems of health and peace?

Among the means available for structuring our experience are the schemata devised by researchers and theoreticians. Unfortunately, schemata derived from educational theory and research are sometimes rejected out-of-hand by educational practitioners. At times this rejection is for good reasons, as when the theory or research is almost completely unrelated to the realities of practice. On other occasions, the rejection stems from an understandable but unjustifiable failure to comprehend the theory building or research enterprise. To study a setting, researchers are compelled by their purpose and their methods to reconstruct that setting. This reconstruction is based not on the researcher's experience in the setting (though that may be a contributing factor) but on how the researcher must conceive a problem in order to seek a solution to it. The result is a frame of reference and point of view that is initially surprising and confusing to many practitioners. Scheffler (1973, p. 77) states this point forcefully:

> What the scientist rejects is the rule of the familiar. His job is precisely not to take for granted the customary conceptual apparatus of his environment but, through criticism and invention, to develop more adequate intellectual equipment which will encompass this very environment along with other actual and possible ones.

Bridging with schemata rather than merely with evidence, or solely with rules, is made difficult because the researcher has rejected the familiar while the practitioner clings to it as a means of making sense out of experience with the work setting. This difficulty has to be overcome if the practitioner is to gain the advantage of employing research schemata as a means for structuring experience. If the difficulty is overcome, the schemata are available as contributions to the education of the practitioner.

Thus far this discussion of schemata has presumed that the interaction between researchers and practitioners is a one-way affair, from researcher to practitioner. That this presumption emerges from the discussion is a feature of the particular topic being examined here: How are the knowledge and understanding gained from research on teaching transferred to the educational practitioner? If the larger picture were the concern of this chapter, it would not be necessary to depict knowledge and understanding as flowing only from researcher and practitioner. The researcher has much to learn from the experience, insights, and reflections of the practitioner. It is becoming increasingly clear that researchers who ignore the realities of practice not only risk destroying the value of their work for practice but may also jeopardize the inherent quality and significance of their research (Fisher and Berliner, 1977).

Another caveat is in order. Not all research provides new or powerful schemata. A high proportion of research work is devoted to replicating the findings of previous research, or studying phenomena for which new schemata are unnecessary. Research without schemata, however, is still of value to practitioners. It is a source of evidence for assessing the reasonableness of beliefs about teaching and learning.

Bridging Effectively

Three kinds of bridging between research and practice have been described. Bridging can be done with rules, with evidence, or with schemata. These are probably not mutually exclusive categories; hence combinations of any two or of all three are possible. What I have tried to make clear are the ways each is performed and their consequences for the education of practitioners. The underlying question throughout has been: How should bridging take place, given a concept of what it means to participate in the education of a fellow human being? What has not yet been addressed is the more factual question: Can research on teacher effectiveness enable a teacher to become more effective?

The answer to this second question depends, I think, on how you choose to define effectiveness. Is an effective teacher one who is able to produce demonstrable gains in student achievement in such basic skills as reading and arithmetic? If so, there is much to commend the use of rules in bridging the BTES and similar studies with educational practice. If teaching is exclusively a skill the characteristics of which are well defined, then it may be possible to formulate rules governing the exercise of this skill. In this case, the teacher demonstrates the skill of teaching by closely adhering to and following the rules. Even in this fairly rigid view of teaching there is room for display of discretionary performance by the teacher. But this discretionary authority exists only because it is surely impossible to ever write a truly complete rulebook. If such a book could be written, discretionary authority would be at an end.

In contrast to the view that effective teaching is the production of demonstrable gains in student achievement there stand 30 centuries of philosophic literature on education, most of it arguing a conception of education not warmly received in the contemporary political and professional milieu. This literature suggests that teaching is a skill, but also more than a skill. It is not solely a phenomenon that conforms to rules but is as well a phenomenon about which we can have knowledge. If teaching is an activity about which we can have knowledge, is it not reasonable to contend that those who teach ought to have what knowledge is available about what it is they do? If the answer is affirmative, it is in support of bridging with evidence and schemata, for that is precisely the point of these kinds of bridging: to provide to teachers and other educational practitioners the knowledge that others have about teaching.

There is a problem with this position. It has long been recognized that a person can know what is right to do but still not do the right thing. Can such an argument be made about teachers—that their merely knowing what is required to produce demonstrable gains in student achievement does not ensure that they will do these things? Yes, this could be said. But it misses the point. It assumes that the production of demonstrable gains in achievement is the sole criterion of effective teaching. It could be argued that an effective teacher is one who knows a great deal about teaching. This argument is not likely to withstand the extraordinary pressures of accountability in these times, so it is best not to push it too far. Fortunately, there is another alternative.

An effective teacher is one who successfully provides to students the means to structure their experiences in ways that continually enlarge knowledge and understanding. There is little doubt that reading and arithmetic abilities are critically important means for structuring experience. Actually they are means to other means. That is, by being able to read and calculate, we are able to gain access to literature and thought processes containing the concepts, theories, and methods which enable us to continually enlarge our knowledge and understanding. Though I have but tacit evidence for it, it does seem possible to teach someone to read and calculate without enabling their access to the literature and thought processes which enlarge their knowledge and understanding. It is for this reason that I argue for treating educational practitioners in ways that provide good models for their treatment of learners.

In the absence of unattainable certainty about the best way to teach effectively, rules should be sparse, evidence plentiful, and schemata followed to wherever they might lead. This advice, taken seriously, would prevent one outcome that should not be the result of research: the conversion of research findings into ideology or dogma. Bridging with evidence and schemata avoids ideological and dogmatic interpretation. It is a way to gain full advantage from the seminal insights and perspectives afforded by the Beginning Teacher Evaluation Study.

7

BTES: Implications for Preservice Education of Teachers

Karen B. Kepler

"So what's new?" may be a common reaction amongst preservice teacher educators to the BTES report. Sure, most of us accept the idea that "teaching processes affect student classroom learning, which, in turn, affects student achievement" (11-1).[1] And most of us would probably agree that the ability to diagnose, prescribe, present, and monitor instruction and provide feedback to students are essential teaching skills. And, if increasing reading and math achievement scores is our aim, it seems almost obvious that increasing the time allocated to tasks specifically relevant to the tests, improving students' attention, and raising the proportion of response opportunities which indicate mastery would be useful. Not only do the model and findings appear commonsensical, but they probably reflect principles already underlying most preservice teacher education programs.

But it would be unfortunate if the "not new" response led readers to dismiss the study prematurely or to jump to implications for restructuring teacher education programs or certification procedures. Neither reaction does justice to the BTES research effort or to the cautions which the researchers offer in the technical report version of the study.

Rather, those concerned with preservice education should study the unabridged edition, discussing the underlying assumptions and the validity of the findings before considering implications. Under study, the report is

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[1] In writing this paper, I am commenting on two BTES documents. Citations from the "summary" document are noted by page numbers. Citations from the technical report are noted by chapter and page number (i.e., 5-23 refers to chapter 5, page 23). Citations from other works will be noted by author's name and page reference.

bound to generate many questions and reservations as well as trigger some thoughts about implications for practice. There is much to talk about here—issues that teacher educators have to face regardless of their judgment about the substantive findings of this particular report.

In this paper, I have organized my own comments in a manner which will hopefully be useful for discussion regardless of reaction to my particular views, which are certainly colored by my experience and present circumstances.[2] My reactions fall into three categories:

1. *Underlying assumptions*, which raise questions about the usefulness of the BTES findings for teacher educators.
2. *Problems in the presentation of the findings*, which may be particularly troublesome for preservice educators.
3. *Implications for preservice education*
   a. Present implications
   b. General implications, when and if knowledge base is strengthened.

Before proceeding, let me reiterate that I am reacting from my own limited perspective. And I am making no assumption about the generalizability of my opinions. They are offered merely as a catalyst for discussion.

Underlying Assumptions

The BTES study empirically examined hypothesized relationships among teaching process variables, Academic Learning Time (ALT), and student achievement. According to the model, teaching processes affect student classroom learning (ALT), which, in turn, affects student achievement (figure 7.1).[3]

There are several assumptions implicit in the design, interpretation, and dissemination of the study which need to be clarified. These clarifications, most of which are offered as cautions in the unabridged technical report,

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[2] My direct experience as a preservice teacher educator has been in a small liberal arts college and a large, urban university. I have taught and supervised in K-9 public and private school classrooms in Boston, Cleveland, suburban Chicago, western Massachusetts, and New York City.

[3] For consistency, I have substituted the term "high success rate" used in the summary report for the original term, "low error rate," used in the technical report.

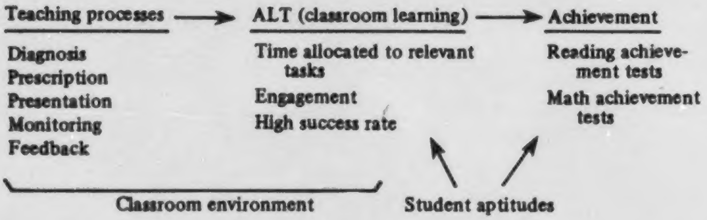

Figure 7.1. BTES Model

Teaching processes
ALT (classroom learning)
Achievement
Diagnosis
Prescription
Presentation
Monitoring
Feedback
Time allocated to relevant tasks
Engagement
High success rate
Reading achievement tests
Math achievement tests
Classroom environment
Student aptitudes

clearly limit the findings as a source for restructuring preservice education or certification procedures. Given certain value orientations, the clarifications even cast doubt on the advisability of integrating the findings into existing preservice curriculum or supervision practices.

In thinking about what BTES means for preservice education, I find that three sets of underlying assumptions are unsettling: (1) the narrow vision of "teaching and learning" in elementary schools implicit in the research design; (2) the particular value orientation which pervades the interpretation of the data; (3) the "simplify/don't qualify" approach to dissemination implicit in the summaries.

The vision of "teaching and learning" in elementary schools implicit in the research design is limited on many dimensions. As professionals responsible for preparing elementary school teachers, we must remember that the findings are limited to learning in reading and math as defined by standardized achievement tests. Other kinds of cognitive learnings in these and other subjects, as well as affective goals, are not addressed in the present ALT model.[4] As the researchers remind us, both ALT and achievement tests are useful, but incomplete, measures of student learning (7-34).

Additionally, the results are generated from research in classes which "tended to be relatively teacher centered" (11-32). And from the classroom examples given (8-19 to 8-32) and the researchers' comment that an allocated time block is the "maximum time available" for a given subject (2-3) and the fact that field trips and Christmas plays are lost time (9), one infers that these were mostly classrooms where academic subjects were taught discretely rather than in an integrated or project-oriented fashion. This apparent selection bias limits generalizability.[5] And viewing the allocated time block as the "maximum time available" (2-3) may eliminate a possible distinguishing factor between more effective and less effective teachers. Perhaps discrete time allocation interacts with opportunities for reinforcement during other "subjects," providing a more powerful impact on achievement. For instance, the teacher who not only allocates a specific time for reading and math but conscientiously reinforces reading and math skills while teaching social studies, science, music, art, etc., may be the most effective.[6]

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[4] Although not represented in the ALT model, a 16- to 25-item measure of attitudes toward reading, mathematics, and school was administered and an exploratory, nonconclusive analysis conducted. The researchers suggest "it would be desirable in future development of the ALT model to include student attitudes as a component of the model" (9-1). And it would also be desirable to include other cognitive and affective goals as *outcome* measures in further development of a model of "teaching and learning in elementary schools."

Even more critically, the findings are based on students who scored in the 30-60 percent achievement range on both tests. We do not know if these results hold for children in the bottom 30 percent or the upper 40 percent or for children with one score outside the middle range.[7] For instance, one might speculate that high-achieving children might need less substantive interaction, prefer a more challenging moderate error rate, and become bored with increased review time on skill-oriented achievement test material which they have already mastered. There is some tentative evidence to support this counterhypothesis in the less-than-consistent findings at the fifth-grade level (11-22).

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[5] I say "apparent" because the sample representativeness may be less restricted than the examples imply. If so, there is obviously a need for a better description of the classrooms under study.

[6] After reading a draft of this chapter, Dr. Richard Marliave has indicated that the researchers' theoretical characterization of "maximum time available" did not constrain data collection on allocated time. It is good to learn that reading in content areas was included within reading allocation totals, since I had received a different perception from the following statement in the report: "Most of the detailed coding took place during reading and mathematics instruction, for which specific content categories, student behaviors, and student teacher interactions were all recorded. However, during other instructional activities, such as science or art, a general code was sufficient" (3-11). I still wonder whether the observational coding schedule was sensitive enough to pick up the variety of ways math and reading can be reinforced in other subjects, in activities and projects, in free time, and in managerial interactions. Additionally, it is hard to determine the impact of the coded related content in reading and math, since all the descriptive and analytic tables have lumped such work under reading and math totals (e.g., 4-8, 4-17).

[7] Interestingly, almost one-third of the original volunteer classrooms were eliminated from the study because they did not have at least six children falling in the 30-60 percent ranges on both tests.

And despite the importance of social class found in other recent studies on direct instruction, social class differences were not examined. In reviewing classroom instruction studies, Rosenshine (1976) describes the relationship between social class and several relevant variables (e.g., individual versus group work, oral responding versus seatwork, percentage of correct answers, feedback strategies, frequency of teacher questioning about self, procedural versus substantive contacts, student-initiated contacts involving personal concerns). In light of the BTES findings on the positive relationship between achievement and high success rate, Rosenshine's conclusion about the difficulty of questioning is of particular importance:

> These results suggest that the difficulty of questions should be near the child's level of ability in classrooms with children of low socioeconomic status, whereas it is better to ask questions slightly above the child's level of ability in classrooms with children of high socioeconomic status (361).

Hence, in talking about the findings, we must remember that the study was designed to address only certain aspects of test-related teaching and learning in apparently relatively traditional elementary school classrooms for children of average achievement, undifferentiated by social class.

Another limiting factor is the particular value orientation which pervades the data analysis and interpretation. As a February 1976 technical report noted, "The BTES staff shares, with other researchers, a growing belief that direct instruction is a causal factor in student achievement" (Berliner and Rosenshine, ii). This orientation influenced not only the design of the study but also, understandably, the interpretation, since the study essentially became a validation of the relationship between "direct instruction" factors and achievement. Perhaps because of their belief in the model, the researchers appear to have played down the value decisions involved in interpreting the findings and certain contradictory results.

For instance, the report suggests that children score better on achievement tests if more time is allocated to task-relevant activities. While the issue of the importance of improving reading/math achievement scores relative to other goals is acknowledged, it is deemphasized, and the desirability of more time is implied in the discussion of the findings. We read that, on the average, 66 percent of instructional time in these second- and fifth-grade classes is already devoted to reading, language arts, and mathematics.[8] Then, in the description of an effective teacher, BTES cites the example of a second-grade teacher who devotes 80-89 percent of each day's instruction to reading, language arts, and mathematics (8-23). How much is enough? Too much?

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[8] In the second grade, 5 percent was devoted to other academic subjects (social studies, science) and 29 percent to nonacademic subjects (art, music, physical education). In fifth grade, 7-11 percent was devoted to other academic subjects and 22-27 percent to nonacademic subjects (4-7).

The implied call for more time to be allocated to reading and mathematics instruction involves many value judgments–judgments about priorities among goals and among students, the importance of increasing math and reading achievement scores, the definitions of success criteria, the valuing of mastery versus coverage exposure, quantity of time versus quality of experience, maximizing versus minimizing individual differences, and the focusing on ALT variables which accounted for 10 percent of the variance in achievement rather than on the teaching process variables which accounted for an equal amount of variance. These decisions involve value judgments which should be debated rather than hidden among a set of findings which appear definitive enough to generate specific policy statements.

While I am definitely an advocate of direct instruction as an important part of elementary education, a possible bias in the analysis and interpretation of the data makes me uneasy. Let me give several samples:

1. The use of .10 as the level of significance rather than the .05 level of significance more typically used in social science research.
2. The use of overgeneralization and implied significance. For instance, table 4-6 of the summary report, which shows the effects of engaged time (A-B period) on achievements, lists one .01 significance finding, two at the .10 level, and eight nonsignificant findings for the second grade. At the fifth grade, there are four findings significant at the .01 level, one negatively significant at the .10 level and seven nonsignificant findings. Yet we read: "The results of table 4-6 indicate that engaged time was positively related to student learning." At the end of the paragraph, we do find a qualification: "It should be noted, however, that no significant effects were found in grade 2 mathematics or grade 5 reading for the A-B period on engaged time" (4-18).

   Similarly, in chapter 11's report of the regressions analyzing the combined ALT effects, we find a deceptively conclusive statement that "student engagement rate during allocated instructional time in reading or mathematics is positively associated with learning" (11-8). The following paragraph, noting some qualifications, leads us to believe that a more significant relationship exists than is actually evident in chapter 4 (4-30 to 4-33).[9] And then, even the qualifications are totally missing from the more abbreviated summary report.

3. The use of linear extrapolation. Although the authors warn about the speculative nature of using linear extrapolations, they write that linear extrapolations "indicate that intentional manipulation of one ALT variable, allocated time, could produce substantial and important changes in student achievement" (4-39).
4. Causal interpretations inferred from correlational data. Correlational data slide into causal interpretations in the summaries despite warnings from the researchers in the technical report.
5. Description and prescription distinctions. There is a confusing tendency for descriptive data (i.e., success rate or seatwork versus group instruction) to become the norms for prescriptions of more/less and high/low. For instance, 70 percent (mean: 70-75 percent) is set as an engagement goal (7-22); working at a high success rate means anything more than 50 percent of the time (mean: 50 percent at grade 2; 34-46 percent at grade 5) (4-11); allocating two-thirds of the time to seatwork (mean: 60 percent) is seen as having a negative effect on attention (11-5).

Interpretation for practitioners is made difficult and relative because of the confusion between description and prescription, the unexplained basis for prescriptive decisions when given, and summary statements which do not mention the numbers used by the researchers in classifying, describing, and prescribing.

My third area of concern is the implicit assumption that it is desirable to "simplify/don't qualify" when disseminating research findings to practitioners and the general public. I do agree with BTES' viewpoint about the use of less-than-definitive data:

> it is worth recognizing that one may reasonably base a belief on inconclusive evidence. No knowledge is ever absolute. Even experimental analyses are generally open to more than one reasonable interpretation,

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[9] In the summary tables 4-14 to 4-15, we find the following significance reported at the .10 level:

A-B Period
Grade 2 reading (3 out of 4); math (1 out of 7)
Grade 5 reading (1 out of 4); math (2 out of 8)

B-C Period
Grade 2 reading (2 out of 7); math (none out of 10)
Grade 5 reading (1 out of 4); math (2 out of 8)

Referring to table 4-12, we find that none of the relationships in the A-B period is significant at the .01 level. (Table 4-13 for the B-C period is a blank page in my two copies of the report.)

> particularly when one wishes to generalize to natural situations and events. Correlative data combined with experiential knowledge and logical reasoning often provide considerable evidence for causal relationships. One should recognize the limitations of such evidence, but not disregard it (4-36).

Yet I do not think the findings should be presented in such a clear, unqualified manner as to suggest definitive results which in turn yield premature prescriptive statements. The summaries reported in chapter 11, which do present some qualifications, are in striking contrast to the unqualified major findings reported in the summary report. Not only is this misleading, but it does not let the reader decide how much inconclusiveness is appropriate. Rather, it leaves the judgment up the BTES staff, who are admittedly already favorably disposed toward direct instruction. Granted, the dissemination of qualified findings provides a particularly difficult problem because the audience is already skeptical about the utility of educational research findings. But my sense is that the BTES researchers have gone too far in making their findings sound more definitive than they really are.

My discomfort with these three aspects (narrow vision of "teaching and learning," the possible influence of researchers' biases, and the "simplify/don't qualify" approach to dissemination) make me hesitate about emphasizing prescription in this implications paper. Obviously, there will be others who are not troubled by these problems—yet I believe that they should be clearly understood by all who are discussing the implications for preservice education and that qualifications should be clearly stated in any policy implications emanating from the BTES findings.

Problems in Presentation of the Data for Preservice Educators

Besides the limitations discussed in the preceding section, there are some other problems in the presentation of BTES for those of us who work with preservice students. These problem areas include the overall message, allocation of time, high success rate, group work versus individual work, academic versus affective, and statements about curriculum.

Overall Message

Most preservice students are anxious about how successful they will be as student teachers—and most are somewhat overwhelmed as the complexity of classroom teaching unfolds. Memories of their own experience in elementary school—both good and bad—help to create a sense of familiarity and idealized visions. In the classrooms, new dimensions appear—dimensions which cannot be prepared for in coursework. Many important elements such as feeling comfortable with the role of authority, appropriate pacing, or "with-it-ness" can be achieved only through actual experience. Preservice educators, be they college supervisors or cooperating teachers, play an important role in helping preservice students cope with reality and evolve into effective teachers. We can give students a general framework, specific knowledge and skills, some tricks of the trade, feedback on their performance, and suggestions for the future, and we can model good teaching, problem solving, and critiquing. But we cannot pass along one recipe to be followed by all preparing to teach elementary school.

Not only are we without a validated recipe, but differing values, personalities, and contextual circumstances preclude such an approach to teacher training. Out of necessity most of us must prepare students with a pluralistic view toward teaching and learning. And information from a recent national survey of teacher education programs indicates that faculty and students do accept ideas about teaching and learning which represent many different orientations. While this acceptance could be interpreted to mean a "lack of differentiation among orientations," it might also mean a clear tolerance for multiperspectives (Joyce, 1977, p. 15).

Keeping the BTES model in a multiperspective context and qualifying these particular findings will be a challenge for preservice educators who believe there is no one right way to teach/learn for all students, all teachers, all goals, all subjects. Although the BTES never claims that it presents the "recipe" for all teaching/learning in the elementary school, the centrality of the direct instruction model and the implied unqualified prescriptions may be misleading, particularly for preservice students looking for *the* way.

Allocation of Time

Allocation of time proved to be one of the strongest variables in explaining residual variance of achievement scores (4-38). Unfortunately for preservice students, this is the one variable over which they have the least control. Generally, cooperating teachers determine how time is allocated in the classroom.

In discussing how preservice students might allocate time in their future classrooms, we cannot leave them with the impression that more is better. Even if we accept the value orientation of the BTES model and recommend that more time be devoted to reading and math, we clearly need to address the possibility of diminishing returns and the negative impact of too much time. We need more research about limits of time allocations and descriptive studies indicating how good teachers know when more time is worthwhile. Obviously, in further pursuing this issue, we will find ourselves in the realm of value judgments—but this is fine. Preservice students must understand that such decisions do involve value as well as objective judgments.

High Success Rate

Advising preservice students to design learning experiences which yield a "high success rate" is fraught with problems because of the contradictory evidence in the BTES study (i.e., inconsistent findings for the fifth grade[10] and the lack of relationship to planning variables, appropriateness of instruction, knowledge of subject matter, allocated time in second grade, etc.). It also presents problems because of the narrow range of students for which it might be appropriate; the different rates advisable at different stages of learning, at different times of the year, at different ages, in different schools;[11] and the confusion around what proportion of time indicates "high success rate" and the appropriate balance between high and moderate success rate.

Since most student teachers intuitively know that a lesson is "too hard" if the children can only answer correctly at a chance rate, the critical balance is between high and moderate success rates. From the BTES study, we know that spending 50 percent of the time at a high success rate was the norm for second grade, and the norm for high success rates for the fifth grade was 34 percent in math and 46 percent in reading. BTES recommends that students work on material which yields a high success rate for them at least half the time (11). Yet in the descriptions of six second-grade "outlier" classes—those differing most from the average—we find the high success rate for high-achieving classes (reading: 59 percent, 64 percent, 32 percent; math: 66 percent, 73 percent, 55 percent) and low-achieving classes (reading: 64 percent, 47 percent, 39 percent; math: 51 percent, 59 percent, 37 percent) demonstrating quite a variety (8-16). We also know that the results were not consistent at the fifth-grade level. Where does BTES get the 50 percent figure? And, if it is 50 percent, wouldn't it be clearer if the conclusions were stated using a less misleading term than "high success rate"? For in reality, "high success rate" does not mean a high "high success rate" but rather a moderate "high success rate" combined with an almost equal dose of "moderate success rate."

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[10] Fifth-grade exceptions: 4-28 to 4-33, 7-36, 9-12, 11-8, 11-12.

[11] The school norms may be another factor affecting student response to the high/medium success rate balance. In a year-long study of seventh graders, Kepler (1978) found that most teachers asked questions which the responding student answered correctly 85 percent of the time. The one teacher who generated the most negative effect asked questions that yielded a 67 percent correct response. Deviation from the school norm rather than the balance of high/medium may have been the critical variable.

Again, we come to a research question which needs to be answered: What is the appropriate balance? How do teachers make judgments and adjustments in success rates? How much review and practice is necessary? What happens in whole-group instruction when children achieve 100 percent success rate at different times? How do you know when to move on? Again, not only research findings, but value judgments about priorities, mastery levels, and coverage come into play in these decisions.

If the advisability of the "high success rate" proves more universal, if the appropriate balance between medium and high success rates becomes clearer, and if the logistics can be worked out for the normal heterogeneous class of 25 to 35, the challenge for preservice educators will be to make sure that student teachers do not unwittingly fall into lowering expectations to provide their supervisors with evidence that they can teach so their students make few errors. Just because students are producing many correct responses on the task does not, contrary to a BTES statement (3), mean that students are learning. Rather, they may just be demonstrating what they already know and, possibly, the student teacher is not accomplishing enough new learning. Another area which might be misinterpreted by students is the negative association between "explanation-need" and high success rate (6-21). For student teachers, the ability to give "explanation-need" is especially important since their preplanning diagnostic and prescriptive skills are limited by lack of experience. So, although a high level of explanation-need may reflect lack of planning for the experienced teacher, it may represent strong diagnostic-prescriptive skills in the preservice student. Explanation-need is not used here as an instructional strategy (6-23) to produce superior understanding—as it might be with experienced teachers—but is rather the result of a lack of experience. Failing to give explanation-need when appropriate may be a serious problem for student teachers.

Rather than learning to emphasize high success rate, I think our students need more help in using the errors children make in the "moderate" range to diagnose problems and to adjust instruction on the spot or in the future. They need help in providing children with enough practice to reach whatever their criterion of mastery may be, while keeping an appropriate balance with new learning for the group and for the individual children who have already achieved the mastery level. It is toward these more complex areas, rather than toward a "high success rate" *per se*, that our efforts as teacher educators should be directed.

Group Work versus Individual Work

At the end of the BTES report, we are told that "by keeping in mind the joint goal of student attention to appropriate task with a high success rate, the teacher can evaluate the current organizational structure and adapt it over time" (43). The problem for the preservice student is that the "BTES model can be thought of in terms of two general goals which are partly in conflict with each other" (40). The student is told on the one hand that greater substantive instructional interaction helps insure higher engagement and on the other hand that high success rate is necessary. Given present adult-child ratios, engagement seems to be higher when students are in a group setting because they get more "substantive instructional interaction." Yet to ensure an appropriate success rate for all students in a large group is almost impossible. Then, contradictorily, we are told that the fifth-grade instruction was judged more appropriate (a rating which was positively related to achievement) when the classes had an individualized program with a moderate success rate. And the authors comment, "In sum, the proportion of high success rates seems to be a function of the type of classroom organization and/or what the teacher considers to be appropriate" (31). Clearly, these dilemmas demand further research before the neophyte attempts to implement the findings.

If a balance between whole class, small group, and individual instruction and between moderate and high success rates is the desired compromise, then it should be stated up front with the substantive findings rather than in the back as a possible implication. The present contradictions between the apparently definitive findings and the later qualifications are bound to cause confusion and skepticism on the part of preservice students.

Academic versus Affective

The polarization of academic and affective orientation is not only misleading in terms of the actual BTES findings, but also likely to alienate many preservice students whose motives for entering teaching often fall in the affective domain.

The finding states, "Teacher orientation toward affect was negatively associated with academic achievement" (15). This is not as harsh a judgment against affective concerns as might be imagined at first reading. First of all, the technical report summary of this item reads, "Teacher orientation toward affect *to the exclusion of academic instruction* is negatively associated with academic learning" (11-17). This result is obvious. Additionally, it does not necessarily follow, as BTES implies, that being "oriented to affect" was the reason these teachers devoted less time to academics (15)–they could be poorly organized or oriented to other subjects like social studies, science, art, and music. More seriously, one has to read the report to find out that the negative correlation between affect and achievement never reaches statistical significance (7-19).

And another conclusion indicates that concern for the affective learning environment may actually help academic achievement. "A learning environment characterized by student responsibility for academic work and by cooperation on academic tasks was associated with higher achievement" (16).

Digging into the unabridged version softens the antiaffective charge even more. In talking about flexibility in the use of the curriculum, which was correlated with orientation to affect, we read:

> These teachers were concerned with what the students liked or were interested in. They would do things like use the most interesting stories in the reader or extend a lesson if the students were enjoying the discussion. Presumably, these teachers used easier material because they wanted students to like what they were doing. (Data in chapter 9 suggest they were right!) (6-20).

And the fifth-grade data reveal the importance of affective concerns to them:

> The findings presented in table 9-6 may indicate that grade 5 students react positively when the teachers seem to give them individual attention. Fifth grade student attitude change is positively correlated with variables involving the teachers' affective and academic recognition of their individual needs and differences. This is indicated by the positive correlations of residual attitude at grade 5 with orientation toward affect, program change-need, item prediction, differentiated perceptions and appropriateness of curriculum for individuals. However, grade 5 students may react negatively (in attitude) toward the teacher's concern for substantive academic curriculum per se as distinguished from the teacher's concern for the relationship between the academic curriculum and student needs. This would be indicated by the negative correlation of fifth grade student attitude change with teacher academic knowledge and competence. It is possible that fifth grade students react negatively to teacher academic knowledge and competence when it reflects a greater teacher concern for the substance of instruction than for the relationship of the instruction to individual students. This could be related to negative student reaction to lack of individual attention from the teacher. Bear in mind, however, that these are tentative conclusions based on liberal interpretations of the data (9-17).

And then in the last chapter, we discover that "almost all second grade classes had a relatively high degree of concern for affect" (11-39). And the value judgments are clearly added in this concluding chapter:

> It seems reasonable to look for a middle ground. Many teachers give first priority to academic instruction but are also aware of student feelings and value human development. The high-achieving grade 2 classes show this to some extent. There are other good examples in both grades of teachers who make a sincere effort to provide competent academic instruction and also take into account student interests and human feelings. Often these classes are in the middle range of ALT

> **and/or achievement. The conflicting demands of different goals may tend to moderate achievement demands. For many people this is an acceptable compromise.**
>
> **... In grade 5, the sample as a whole was relatively more concerned with academics. No classes were as affectively oriented as class F. Some classes were very strict and exclusively work oriented. In these classes, field workers tended to describe the atmosphere as "tense" or "uncomfortable." These classes tended to score well on achievement tests. (Perhaps they were most thoroughly disciplined to try hard on boring tasks.) Some people might judge the cost too great. (11-39).**

Statements About Curriculum

BTES has explicitly limited the scope of this study to specific teaching/learning variables and has excluded consideration of curriculum. Limiting the scope of the study was necessary, but to say that "curriculum is of less direct importance for teacher training" (8-33) reveals a major misunderstanding about what we as preservice educators are doing. Our students are struggling with both curriculum and instruction concerns; to divorce the two and claim the primacy of one is inappropriate.

Additionally, although claiming not to address curriculum, the study includes several messages about curriculum which I would find disturbing if expressed by preservice students. For example:

(1) It is interesting to note that "curriculum" (textbook series) has not represented a crucial variable in our model of classroom learning (8-33).

(2) For each pupil, a certain portion of the school day is set aside for work on decoding. This block (or blocks) of time constitutes the maximum time available for the student to work on decoding (2).

(3) Typically, if 180 school days are mandated by the State Legislature, about 30 days of regular instruction are usually lost due to field trips, student illness, the Christmas play, etc. (9).

(4) The learning student spends a lot of time practicing and reviewing skills. He/she undertakes an activity related to a new skill only after thoroughly learning skills prerequisite to the new skill, so that he/she virtually never encounters an activity that is really entirely new (24).

It is hoped that our students do not graduate equating curriculum with textbook series, allocating skill development to specific discrete times, overlooking the powerful learning potential in well-planned, integrated field trips and plays, and abstracting principles appropriate to skill development to other kinds of conceptual, process, and affective learning outcomes. I am afraid that even though BTES researchers do not deal explicitly with curriculum, there is a particular model of curriculum implicit in their discussions. Its desirability is debatable.

Present Implications

As a result of my belief in the limited vision inherent in the study and the inconclusive nature of the findings, perhaps a legitimate response would be to postpone discussion of policy/program implications until further research is completed. But reality does not allow us that luxury. Regardless of the study's limitations, there will be people who seek to implement the findings and there will be administrators, school boards, press, teachers, student teachers, and even some preservice educators who will respond in good faith. And, of course, there will be those representing a particular educational viewpoint who will seize upon the "evidence" as proof of their rightness. Hence, the major implication for us now is to make sure the dissemination and discussion of the findings takes place in context—with the limitations clearly understood and with the value judgments distinguished from objective evidence.

Although the BTES does not provide the "recipe," the identified ingredients are certainly useful, if not new, categories to help in talking about teaching. While it would be surprising if there were more than a few preservice educators who do not already accept the importance of the teaching process variables (diagnosis, prescription, presentation, monitoring, feedback) or the classroom learning variables (time allocated to task, attention, appropriate level of instruction), their appearance here gives us all a chance to evaluate our own program's attention to these variables—not to the exclusion of others and not necessarily with the prescriptions offered here (i.e., high success rate), but as manifested in the context of our view of teaching/learning in the elementary school.

In reviewing how our programs help students achieve an understanding of such variables, perhaps we will find that there are certain areas which need more attention. In light of the recent national survey of teacher education programs (Joyce, 1977), I would suspect that "diagnosing diverse student needs" will be an area needing improvement. But the same study also shows us that these variables cannot be used as the only or the most important checklist in internal evaluation of preservice programs. The two other areas which faculty and students think need improving would be overlooked: "understanding legal, political and organizational structure of schooling" and "working with both economically disadvantaged and multiethnic constituencies" (Howey, 1978, p. 39).

In discussions with students, the BTES will also be useful in providing concrete illustrations of the dilemmas and the complexity of teaching, which go beyond the superficial clarity of the findings. The study clearly demonstrates that teachers need to struggle to find the appropriate balance between conflicting forces within the context of their own goals, the community's expectations, and the needs of the specific learners. The teacher's dilemma is to find a balance between such factors as:

- High and moderate success rate
- Whole class, small group, individual instruction
- Time allocated to different subject matter goals
- Cognitive and affective concerns
- Coverage and mastery
- Teacher decisions, joint decisions, child decisions
- Absolute attention and realistic inattention
- Standardized criteria of evaluation and idiosyncratic criteria
- Needs of individuals and needs of the group

Even when explicitly considered, the BTES study does not provide the answers to these dilemmas, but it does serve to make their presence more apparent. Teachers make decisions about these dilemmas all the time—how and why would be interesting material to discuss with preservice students. If these decisions are not viewed as conscious ones, based on knowledge, intuition, and values, then beginning teachers will quickly fall into comfortable habits and not have the self-analytic skills they need to improve their own teaching.

Besides these general implications, I find it hard not to grasp onto particular "tidbits" which would be useful to share with preservice students. Obviously, everyone's selection list will reflect her or his own biases and will also present difficulties with preservice students and cooperating teachers' classrooms. Here's mine:

1. The importance of teacher-student interaction in contrast to an overly self-paced environment.
2. The positive relationship between student responsibility/cooperation and academic achievement.
3. The positive relationship between the percentage of other-paced instructional time and engagement during seatwork.
4. The negative relationship between task engagement feedback (usually yelling) and achievement.
5. The presence of some type of positive reward system in the high-achieving second-grade classes in the descriptive sample. (Bionic

> handshakes and praise take precedence in my mind but not precluding ice cream cones and tokens for prizes when the circumstances demand it.)

Because of the aforementioned limited vision inherent in the study and inconclusive nature of the findings, I feel the present implications for preservice educators are limited to making sure BTES is discussed in context; internal reviewing of program in relation to the BTES variables in view of one's own vision of teaching/learning in the elementary school; and discussing some selected findings which may address present concerns.

General Implications: When and If the Knowledge Base Is Strengthened

When and if the relationship between the BTES model and achievement is established as more conclusive and generalizable to a wider range of students, and more descriptive data on how teachers make the decisions implicit in the model are available, then the implications take on another dimension--possible changes in preservice coursework, student teaching, and certification procedures.

Of course, no matter how strong the empirical support for BTES, it would still represent only part of the teaching/learning taking place in elementary school classrooms. How much emphasis should be placed on this type of learning remains a value decision regardless of the strength of the evidence.

And even if math and reading achievement as measured by standardized tests is agreed to be a major goal of elementary schooling, the teaching and classroom learning variables represented in the BTES model would form only a part of the knowledge, skills, and attitudes essential for those preparing themselves for elementary school teaching. BTES does not examine other components of teaching such as subject matter knowledge, child development, observation skills, curriculum development, management and discipline skills, development of positive classroom environment, quality of instruction (variables other than those in the BTES model, such as variety of teaching strategies, questioning techniques, motivation), problem-solving skills, self-critiquing skills, and professional development. Hence, BTES would take its place as one part of the preservice curriculum, with priorities being established within the context of each program's goals. Even if consensus were possible, it is of questionable desirability in light of our pluralistic approach to schooling.

And it is clear that BTES can serve only as context and not as a model for teaching preservice students, because our outcomes are far more complex than increasing achievement scores in reading and math. And the nature of teaching precludes a "high success rate" in learning how to teach. Learning from one's errors is a better mindset than trying to respond making minimal errors, because teaching is too complex to expect perfect performance, and risk-taking and experimenting are critical variables for professional growth. Hence, we should teach using BTES as the model only when our outcomes are similar to those evaluated on math and reading tests.

Thus, the process of incorporating a validated BTES model into a preservice program would essentially be the same as incorporating any new content into the curriculum. The necessary changes would depend upon the existing program. Resulting programs would differ in emphasis, form, and evaluation of the students' understanding of the BTES model. Some elements would lend themselves to micro or peer teaching (i.e., teaching process variables) and some to discussion (i.e., value judgments about balancing conflicting demands, how experienced teachers make judgments). But most of these understandings would have to be developed in actual classrooms with adequate supervision from university faculty and the cooperating teachers, all familiar with the BTES model and capable of using it.[12] If competence according to the BTES model were considered important enough, supervisors and cooperating teachers could use observational schedules to evaluate a student teacher's performance as was done in the study. Student teachers would also need to be given the means to analyze themselves along these dimensions.

Whether competence in the BTES model should be used as part of the criteria for evaluating student teachers would be another institutional decision. If so, this demonstration should take place in the context of the complex teaching situation and not the college classroom, because demonstrating skills in isolation may not be related to "making the whole thing work." If this assessment is going to have any predictive validity for full-time teaching, student teachers need to be given an opportunity for *total* responsibility for a class for an extended period of time.

If a set of competencies were to be mandated by the State, I think it would make more sense to include them as part of permanent certification rather than as graduation requirements. Since competence is dependent on context and experience, and a realistic aim of preservice programs is to produce "moderately effective" teachers (McDonald, 1978), demonstration of competencies should take place after the student teacher is employed as a teacher. Permanent certification some time within the first 3 years of actual classroom teaching would allow for a more valid assessment as well as putting some teeth into the certification process. Unlike the present arrangements, permanent certification would be contingent on performance on the job rather than on perseverance in coursework.

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[12] Obviously, a most influential factor would be placement with a cooperating teacher who was a "master BTES teacher." But I would use BTES competence as a criterion for choosing only one placement for the student teacher–the other would be with a different kind of master teacher, a "reality" placement or one meeting the particular needs of the student.

State investment in the continuing education of probationary teachers would probably yield a higher return than most traditional inservice work. Linking beginning teachers with university and school inservice educators could do much to break down the limiting barriers between preservice and inservice education and between university-based and school-based teacher educators, both of whom bring important different perspectives. Everyone (teacher, education faculty, local school) would be responsible for facilitating movement toward "highly effective teaching status." Other already permanently certified teachers who wanted to work with student teachers could be certified as "master teachers" when they demonstrated the requisite competencies.

Obviously, I believe we are a long way from being able to implement the implications discussed here, either for BTES or for a more general set of competencies. The knowledge base establishing what competencies are essential and generic is not strong enough; nor have we begun to tackle the value-laden issues involved in a mandated plan—maintaining the balance between ensuring a level of competence and allowing a healthy diversity.

Summary

As a basis for discussion, I have focused on underlying assumptions that raise questions about the usefulness of the BTES findings for teacher educators, problems in the presentation of the findings which may be particularly troublesome for preservice educators, present implications, and implications for the future, when and if the knowledge base is strengthened. Regardless of preservice educators' feelings about the substantive findings of BTES, it is evident that there is much to talk about here—issues which will continually face us as preservice educators. It is our obligation, as it is in our interest, to make sure that these issues do not get lost in overly simplistic interpretation and inappropriate implementation.

8

BTES: Implications for Staff Development

Lynne Miller

I approach the BTES findings as one who has been involved in the practice of teaching for some time, first as a teacher in urban secondary schools and more recently as one who works with teachers in staff development efforts in a variety of settings. My initial response to the BTES research can best be described as tentatively positive in terms of what it has to offer to staff development practitioners. Like all research, BTES presents data and theory abstracted from data which may be interpreted and used in any number of ways. Depending on the assumptions and habits of those entrusted with policymaking and staff development activities, BTES could become either a force for the further reification of a narrow view of teaching improvement or an entry point for a careful consideration of the process of teaching and learning, leading to significant professional development. Let me elaborate on this point by drawing two distinctions about the ways in which teachers and teacher development are discussed in the research and in practice.

The first distinction I'd like to make is between a view of teachers-as-objects and a view of teachers-as-subjects. Since the Sputnik crisis in 1957, there has been widespread acceptance of the belief that teachers are targets for improvement and that this improvement can be brought about by the delivery of services. Whether these services are the upgrading of subject matter knowledge by university faculties or training in specific competencies by educationalists qua technicians, they have been imposed on teachers by authorities from outside the world of public schools. Teachers, when viewed as the recipients of the goods and service of outside experts, function merely as the objects for others' intentions and actions rather than as the initiators of their own development and growth. Such an approach has led to the creation of "teacher-proof"curriculums for schools and the development of behavior-specific training packages for teachers. The net result of this approach has been the failure to implement improvements intended for the schools, the development of teacher skepticism about the usefulness of research and the competence of academicians and consultants to apply theory to practice, and the heightening of teachers' resistance to any programs aimed at their "improvement." Sarason (1972) and others have illustrated the futility of reform efforts which view teachers as objects; yet this approach persists and often predominates in the literature and in the field.

The other way to view teachers, of course, is as subjects, as active participants in their own professional development. The Rand Change Agent Study (1973-77) indicates that new policies are implemented and that new behaviors and procedures are instituted only when there is a process of "mutual adaptation." Mutual adaptation assumes that teachers are subjects who are engaged with other subjects in activities of assessment, trial, modification, retrial, implementation, and evaluation around issues of materials, organization, and instruction. This approach has led to some of the successes enjoyed by the open education movement and has provided the framework for the development of teachers' centers, where teachers are taking charge of their own professional learning. Unfortunately, until recently this view of the teacher-as-subject has been a minority position in circles where policy is made. It is heartening to see an increasing awareness of the importance of a decisionmaking role for teachers, as is evidenced by the earlier chapter by Gary Fenstermacher.

The second distinction I want to make in my discussion of how the BTES research may be interpreted and used is the distinction between inservice and staff development. Traditionally the preparation and ongoing education of teachers have formed two components of "teacher education": preservice and inservice. Both components function under the authority of universities or teacher-training colleges. Inservice teacher education has come to be characterized by a focus on individual teachers who are viewed as "students" or "trainees" and who through their participation in academic course work and issue-specific workshops earn credits toward advanced degrees or salary increments. For many teachers, "in-service has failed out of irrelevance, diffusion, haphazardness, and superficiality" (Leiter and Cooper, 1978, p. 108).

The notion of staff development, on the other hand, provides a different, richer, and more complex approach to professional education for teachers.

> We choose the term *staff development* instead of in-service or teacher education/training because it suggests a different approach to improvement, one that considers the effects of the whole school (the staff) on the individual (the teacher) and the necessity of long term growth possibility (development). We reject the idea of giving courses and workshops to individual teachers in isolation from their peers and the school. We further reject the notion that teachers can be "taught" or "trained" to be better teachers by the mastery of mechanical behaviors

> outside the context of theory and practice. We accept and explore further the fact that development means working with at least a portion of the staff over a period of time with the necessary supportive conditions (Lieberman and Miller, 1979).

That is, staff development concentrates on (1) the individual teacher as part of (2) the entire school staff engaged in (3) development activities that take place (4) over time.

Given these distinctions about teachers and teacher development, it should come as no surprise to the reader to learn where my own biases lie. I view myself as someone who is involved in staff development, not in-service, and as someone who accepts the teacher-as-subject as part of my working ideology. With that framework as my point of departure, I can well imagine using the BTES findings as part of my work with teachers in schools. Unhappily but not unpredictably, I can also imagine other people—with other assumptions and values—using BTES for different ends and in different ways. If, as M. Frances Klein suggests in her chapter, it is a behaviorist construction that most underlies the BTES research, then BTES may become yet another vehicle for the reduction of specific objectives, the prescription of discrete behaviors, and the generation of new forms of accountability which undermine the authority of teacher as an individual and of teachers as a collective force in education. If that is the case, then I am quite sure that BTES will contribute nothing to current efforts to improve schools through improving teaching.

If, however, we view the findings through the lenses I propose, I believe that we can find much of value and usefulness that the research contributes to staff developers, school improvers, and teachers. Below I note three useful contributions that BTES makes to staff development efforts.

First and most important, BTES provides information that ultimately links teaching practices to student achievement outcomes. Such information can be extremely useful for a staff developer who is always dealing with the problems endemic to the teaching profession—among them the weak knowledge base, the uncertain teaching and learning links, and the vagueness of goals (Lieberman and Miller, 1978). Although BTES by no means provides the solutions to these problems, it does provide some clues about the process of teaching and learning under specific conditions. These clues may be used to unlock some of the blockages to learning that inhere in teachers' classrooms. By articulating linkages for teachers and by guiding their attention to some of the variables that affect student achievement, the BTES-informed staff developer can help to temper some of the "endemic uncertainties" (Lortie, 1975) of the teaching task and can help teachers to gain a sense of personal efficacy about their work. Such a sense is the prime motivation for involvement in professional development activities (McLaughlin and Marsh, 1978) and is an essential ingredient in the growth of a feeling of professionalism. In a long-range perspective, one of the goals for staff development is to upgrade the profession of teaching in general. The skillful staff developer can use the BTES findings as a valuable means to this end.

Second, the study acknowledges the complexity of teaching as an activity. This perspective on teaching is essential for staff developers to call on in support of their efforts to upgrade the profession. An understanding of the complexity of teaching helps to dignify the profession, not undermine it as do more simple formulations. If teaching is viewed as more than a matter of mastering a recipe book of expert-prescribed practices, then it becomes a creative and intellectually challenging undertaking. By focusing on these aspects of teaching, staff developers and teachers can move away from the "make and take" mentality with its emphasis of "hands-on" experiences which tends to dominate in staff development practice at the present moment. We can rather embark on an exploration of issues and concerns which are theoretical as well as practical. Teaching then becomes an intellectual puzzle that has many possible solutions, requiring many and varied inputs and approaches. We can encourage trial and error rather than replication, problem solving rather than mechanical imitation. Such an approach acknowledges the clinical expertise of the teacher and allows for the collaboration of staff developers and teachers on the project of improving practice.

Finally, BTES provides some useful tools for opening issues and rendering insights about teaching and learning, about classrooms and students. The study provides a vocabulary for describing and assessing instruction, a mirror of sorts that staff developers and teachers can hold up to practice and use as they evaluate their work. For me, the issues and insights that BTES raises cluster around notions of time, structure, and process. In the pages that follow I shall explore these notions further and discuss their implications for staff development.

Time

The notion of time is central to the BTES findings. In the vocabulary of the study, Academic Learning Time is the key phrase for conceptualizing the structure and uses of time in classrooms. More specifically, ALT involves considerations of time allocation, time on task, or engagement, and success rate. ALT provides a very concrete formulation of what is a very abstract notion. Such a formulation has its advantages for the staff developer.

I can imagine staff development programs that engage teachers in monitoring how time is allocated and used within their own classrooms. Such self-monitoring is not difficult to design when it draws on the resources of teachers and the perspectives and skills of staff developers. After an initial look at how the ALT variables are at work in their classrooms, teachers may begin to make modifications in the ways they allocate and use time. They may feel more in control of their classrooms when they learn to manipulate their time constraints more purposefully. What is particularly attractive about the kinds of activities imagined here is that they engage teachers in analyses of their own situations and experiences, they help teachers develop solutions within a specific context, and they allow staff developers to participate along with teachers as describers rather than prescribers. I would think that for each classroom and for each teacher a different analysis and a different modification would emerge. In this way, each teacher would have considerable control over his/her own staff development.

Thus far in my discussion of time, I have focused on the advantages of the concrete notion of time that ALT offers for staff development. But there is more to the notion of time in classrooms than ALT allows us to see. Anyone who has worked in public schools knows that time controls teachers at least as often as it is controlled by them. The very organization of schools places enormous constraints on the uses of time in individual classrooms. Teachers must continually adapt to the demands of supervisors, the regularities and routines of the building, the eternal interruptions from the outside, and the attention to details that internal maintenance requires. In addition, there are the "rhythms" of teaching (Lieberman and Miller, 1978)–the pulse of the classroom, the psychic routines, and the energy levels–that serve to define the interactions between teachers and students, between instruction and learning, and between teachers and their work. ALT is not a useful concept when applied to these notions of time. In fact, ALT does not acknowledge the existence or the power of time when it is viewed in these ways.

The above discussion is presented as a caution to staff developers who may be so attracted by the simplicity and concreteness of ALT as to overlook the complexities of time as it controls and is controlled in classrooms. When ALT is accepted as one small clue in unraveling the puzzle of teaching and learning, it is indeed useful. When it is seen as more than that, it is impractical.

Structure

Deriving from the notion of time is the notion of structure. I view structure as the purposeful ordering or placement of people, materials, and resources in time. In the vocabulary of BTES, this notion is encompassed in the key phrase "setting." On one level, setting can be analyzed and modified in ways that are simple and direct. Working on this level, the staff developer may pose some questions s/he is prepared to explore with teachers. These questions may involve the issues of concrete time I have just developed, as well as issues involving people and materials/resources.

For instance, in regard to concrete time, we may pose the following questions: How much time is spent in academic subject areas? How much time is spent in other activities? How much time is spent in making transitions? In maintenance? How much time is spent in diagnosing student needs? How much time is spent in feedback activities? In regard to people, we may ask: How are people organized for learning? In groups? As individuals engaged in seatwork? At random? In a large group? What is the teacher's position vis-a-vis students in the classroom? Transmitter? Facilitator? Lecturer? Direction giver? Direct instructor? Supporter? Critic? Who makes what decisions about instruction? About sequence? About routines? In regard to materials, the following questions come to mind: How many instructional alternatives exist for any one task? At any one time? For which students? How are materials developed? How are they used? How is appropriateness determined? How is mastery judged? How are materials evaluated for use and usefulness? Who develops materials and how? As when I discussed the applicability of ALT, it is easy to imagine a set of monitoring activities that staff developers and teachers might design around these and similar questions. Again, a major contribution of BTES to staff development practice is that it provides a concrete framework which generates useful questions, questions that can be answered by the manipulation of people, materials, and resources in time.

The problem with using BTES in this way is that the questions it raises serve to uncover many of the complexities and difficulties about teaching that are most debilitating to confront. In considering the implications of structural concerns,

> the teacher must take into account the diversity of the class, devise some workable organizational system, using different settings (groupwork, seatwork) for different students in different content areas at different times during the school day, and keep the whole system adaptable to some extent as student needs change during the school year (Filby, 1978, p. 5).

That is a difficult order to fill. It requires a major restructuring of the classroom and a major reassessment of the teacher role, a role that most practitioners have worked long and hard to define for themselves. This raises staff development to another level of difficulty. When presented with such a scenario, teachers will need a great deal of support to resist the temptation to retreat into the familiarity of old routines.

The staff developer who sees potential in BTES for staff development efforts must well appreciate the enormity of the task ahead. As was the case in applying ALT to classrooms, what seems simple and concrete takes on new complexity when confronted by practice. Staff development has to take place on any number of levels: concrete and abstract, immediate and long-range, practical and visionary. It is also important to acknowledge here again that, in many ways, teachers are controlled by structure, rather than controlling it; this fact can greatly affect the efficacy of our staff development efforts. I shall return to this point in the concluding section of this chapter.

Process

Related to notions of time and structure is the notion of process, a concern for means often independent of a concern for ends. In the vocabulary of BTES, process is encapsulated in the key phrase "interactive teaching behaviors." What is important in this notion, I think, is the focus on the interdependence of behaviors. While the interactive behaviors that the study identifies (diagnosis, prescription, presentation, monitoring, and feedback) are hardly new or earth-shattering, they do direct our attention to the teaching act as something more than the compilation of discrete behaviors. The interactive behaviors identified may be of use to staff developers who are committed to illuminating the intricacies of teaching for teachers. They may be viewed as descriptors of aspects of teaching, providing useful feedback for teachers.

The implications of the process notion for staff development go beyond the level of the teacher and the classroom. They touch the level of the staff developer as s/he is engaged in his/her own work. I view staff development as a teaching activity concerned with the professional learning of teachers. As teachers, we staff developers may apply BTES notions to the illumination of our own work. Our behaviors, like those of teachers, are interactive and depend on the degree to which we control our own time and structure. We may ask: How do we assess teachers' needs? How do we develop prescriptions for our behaviors? How do we present new information? How do we monitor how our assistance is being received? How do we provide for feedback for ourselves? The degree to which we attend to our own behaviors may well be the degree to which we experience success in our work. By accepting the value of process, we do much to counterbalance the emphasis on product that staff development too often connotes to teachers.

I find the notions of time, structure, and process (expressed as "ALT," "setting," and "interactive teaching behaviors" in BTES) valuable contributions to staff development on a variety of levels. On one level I value these constructs in that they are simple and straightforward ways to begin discussing aspects of teaching and learning. On another level I value them because they provide some guiding principles for the work of the staff developer. On yet another level I value them because when considered in the light of the realities of teaching, they expose very clearly the discontinuities between research and practice. I'd like to elaborate on this last point.

One of the characteristics of research is that it limits its field of vision to a small portion of the variables in any given situation. When research findings are applied to practice, an inevitable problem arises from the incongruity of the conditions of the research and the conditions of the social setting to which it is being applied. The very variables that have been excluded from the research are those that are most problematic in practice. There are "missing links"–or what I term discontinuities–between research and practice. It is incumbent on the staff developer to fill in those missing links, to make the movement from research to practice more continuous.

In the case of BTES, the field of vision is limited to individual teachers in individual classes teaching a predetermined set of skills over a limited period of time. This obviously leaves many discontinuities for the staff developer to address. I want to concentrate on one of these here; that is, the discontinuity between a focus on the individual teacher and the social and political context in which s/he is situated. Although the BTES research focuses only on the level of the teacher in his/her classroom, good staff development practice dictates that we tend also to the school as an institution and as part of a larger political system. My earlier discussions of the notions of time and structure also indicated the need to deal with issues outside the control of the teacher in his/her class.

In the discussion that follows I want to focus on three levels of concern: individual, organizational, and political. The purpose of this discussion is to provide a framework for the ways in which a staff developer might work in addressing the discontinuities that inhere in the BTES findings when they are applied to practice.

The Individual

The most powerful implication of any research when applied to practice is that individuals must change their current ways of operating. As noted previously, the BTES findings indicate that a change is required in the ways that time and structure are used in classrooms. For the individual teacher this is a challenge to existing routines which, if not always effective, are at least comfortable. In the past 5 years, some valuable work has been done in uncovering how teachers adapt to required changes and how staff development can help in the process of adaptation. More specifically, we now have the following understandings about this process:

1. Individual teachers adapt to change developmentally; "change takes time and is achieved in steps" (Hall and Loucks, 1978).
2. Individual teachers are motivated by a sense of personal efficacy in adapting new procedures in their classrooms (McLaughlin and Marsh, 1978).
3. Staff development is effective in helping teachers adapt to change when it provides training and support activities which are largely planned by the teachers themselves (McLaughlin and Marsh, 1978).

These understandings provide useful guidelines for staff developers who are working to bridge the gaps between research and practice about student learning and classroom instruction.

Clearly the task of the staff developer is to help teachers take the necessary steps, one by one, which will enable them to modify their classroom procedures and practices without risking their sense of control and personal efficacy. This task requires that the staff developer *be present* in the teachers' classroom and become engaged in the lives of teachers on a regular and frequent basis. By being consistently present, the staff developer may function as an extra and helping set of eyes, ears, and hands in the classroom—working alongside the teacher as s/he takes the first steps toward reordering existing procedures and routines. In addition, by being present, the staff developer is in a position to provide trusted feedback about student progress and achievement, taking care to call attention to the ways in which new teacher practices are concretely benefiting students. The staff developer's presence is perhaps the primary support activity that can be provided; it is a necessary complement to any initial training which introduces new data about teaching and learning. Presence is the ingredient that makes new information, often viewed as abstract and remote, become practical and immediate.

The role of the staff developer must always be secondary to that of the teacher; that is, the staff developer takes his/her cues from the individual teacher with whom s/he is working. This does not mean that the staff developer always acts in a reactive way; indeed, an important function of the staff developer is to provide intellectual stimulation and professional challenge to the teacher. What it does mean is that once the challenge is made and the stimulation provided, it is the teacher who ultimately decides what seems most promising for the improvement of his/her own situation. The teacher, then, sets the task; the staff developer aids in implementation. In another essay, Ann Lieberman and I (1978, p. 67) state that a staff developer must

> have ideas that are pregnant with possibilities, related to what teachers see as meaningful and doable given the real constraints of time, energy, and the dailiness of school.

I think that BTES presents ideas that are "pregnant with possibilities," with important implications for use in staff development. The role of the staff developer is to provide access to those ideas for teachers and to work collaboratively to explore the possibilities and to help transform the possible into the real.

The Organization

Although it is often obvious that new information provides the impetus for individual change, it is not so obvious that change is required on institutional levels as well. I want to argue that without an institutional commitment to improvement and change, individual efforts do not have much promise for success. As a case in point, let's look at the notion of structure again. Structure exists on many levels. There is, of course, the structure of the individual classroom, which, as noted above, can be changed to accommodate new information about the structure of the individual school. This includes the overt structure of activities, settings, and schedules and the latent or hidden structure of the informal rules, conventions, norms, and expectations that define acceptable behavior and set limits to new behaviors. When a teacher tries something new which involves a change in classroom structure, s/he has to be careful that the change does not violate the latent structure of the school in which s/he is situated. This places boundaries on what teachers are willing to try. In addition, teachers may find that the change they want to make challenges the overt structure of the school–timetables or space allocations, for example. Such a change becomes impossible in an inflexible and change-resistant school structure.

The implications for staff development are obvious: the whole school must become a focus for staff development activities if the goal is to influence time, structure, and process. As in the focus on individuals, current understandings about the institutional or organizational level may guide our work. They are:

1. When the school is viewed as the unit for change, it is possible to link individual improvement activities to programmatic concerns (Goodlad, 1975; McLaughlin and Marsh, 1978).
2. Like individuals, schools adapt to change developmentally–in steps (Bentzen, 1974).
3. The principal is the key person in making a school open to and supportive of new procedures and behaviors (Goodlad, 1974; McLaughlin and Marsh, 1978).

Staff development must be multifaceted; it must focus on the principal and the total school as an organization.

For the staff developer, this means that his/her vision must reach beyond the classroom and the teacher, that the notion of presence means being present in the total life of the school. That is, the staff developer must learn the regularities of the individual school, how people live and teach in their school environment. S/he must become embedded in the dailiness of the school and learn the points in which interventions are possible on an organizational level. S/he must see her/himself as working with principals as well as teachers, as involving the whole school as an integrated community in the project of staff development.

The focus of staff development may then become the improvement of a total school program. It is important to recognize that the relationship between teacher development and schoolwide development is interdependent and dynamic, that one affects the other. Those who are concerned with the notions of time, structure, and process that BTES raises must pay particular attention to organizational as well as individual issues. These issues provide some of the "missing links" between research and its application to practice.

Political

Education is political. It is important to recognize that any research and any policy that result from research are viewed in deeply political terms by school people. Given this assumption, BTES has political significance. This is so because it involves a variety of actors and institutions with a variety of interests. To be more specific, BTES is the product of research funded by public monies with the intention of uncovering information about teaching and learning which can add to our existing knowledge and can ultimately influence practice. Accepting this as the raison d'etre for BTES, we admit the following interest groups: professional researchers, the Federal Government, State level disseminators, district level administrators, boards of education, teachers as individuals, teacher associations and unions, and children and their parents. Richard Williams notes the implications of this collection of interest groups for staff development when he says:

> A partial explanation of our seeming inability to launch effective staff development activities lies in the fact that the various parties who are engaged in the designing, providing, and receiving of staff development often, in spite of their public utterances to the contrary behave in ways that are at least as responsive to their own self-interests as they are to their official positions regarding what constitutes a desirable development program (1978, p. 96).

Undesirable as it might be, staff development itself becomes political when it involves the range and variety of interest groups that are involved in BTES.

What does this imply for the staff developer? First, it means that the staff developer must be willing to involve him/herself politically as a negotiator between and an advocate within specific interest groups. Secondly, it means that the staff developer must learn to evaluate the political climate as well as the climate of individual schools and individual classrooms. Finally, it means that the staff developer must function as a "loner" of sorts, someone who is not too closely identified with any one interest group. Viewed this way, staff development is a very lonely profession.

This discussion has focused on one of the discontinuities between the conditions of the BTES research and the social facts of schools and classrooms; that is, the discontinuity between a focus on the individual teacher and the fact that individuals work in a context bounded by institutional concerns. I think that the discussion has been fruitful in uncovering some of the implications for staff development that BTES raises. Equally fruitful, I think, would be explorations of (1) the discontinuity between a focus on basic skill development and the fact of the school curriculum and (2) the discontinuity between the focus on academic achievement and the fact of the interaction of affective and academic domains in a classroom. Such considerations would help to define the "missing links" between research and application to practice, which is the domain of staff development.

Summary and Conclusions

In this chapter I have considered the BTES findings in light of their implications for staff development. Establishing as my starting point a view of teachers-as-subjects and of staff development as a nonprescriptive activity, I identified some of the contributions that BTES may make to practice. I noted that what I find mose useful in BTES are the tools it provides for opening issues and rendering insights about the teaching and learning process. The research offers a lens through which we may view the activities of teachers and students in classrooms. By illuminating the complexities of practice, BTES can be used to help make staff development a relevant and intellectually engaging enterprise.

In addition, I noted the limitations of the BTES research and its applicability to the real world of public schools. Specifically, I discussed the discontinuities between research and practice. By so doing, I was able to stake out the territory of the staff developer–the "no man's land" between the conditions of research and the social realities of classrooms.

I think it is fair to say that a careful reading of the BTES findings exposes some of the complexity, the difficulty, and the exciting promise of staff development enterprises. I would also conclude that, given a specific value stance and a concern for deepening—rather than simplifying—understandings about practice, BTES has some important implications for staff developers.

9

Implementing Practices in Elementary Schools Based on BTES: Implications for the Principal

Richard C. Williams

The purpose of this chapter is to explore the role of the principal in implementing successful practices based on the findings of the Beginning Teacher Evaluation Study (BTES)[1] in elementary school classrooms.

On first reading the BTES, one might reasonably assume that it has very little to do with principals. The study discusses such topics as Academic Learning Time, classroom environment, pupil success rate, teacher diagnostic skills, and effective learning time. The implications of these concepts are obvious for teachers, teacher trainers, and curriculum and instruction specialists. But what about principals? They are rarely, if ever, mentioned in the study.

A common observation about schools is that teaching is largely an isolated activity carried out behind closed classrooms doors. The principal is often described as one who provides little instructional leadership, whose function seems limited to "handling the paperwork" and keeping things running smoothly in the building. Contrary to these perceptions, the professional literature contains abundant admonitions to and by principals to consider instructional matters as their primary task. When principals gather to discuss their role in the schools, there is usually considerable hand wringing about the red tape and bureaucratic demands that keep them from fulfilling their instructional destinies. What is more, the development of collective bargaining in education is viewed by many as further reducing the principals' influence on the behavior of teachers and the teaching process.

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[1] I will utilize the term BTES to represent the constellation of teacher behaviors that were identified in the BTES research.

Given this perspective on the principal's apparently limited impact on instruction, it is legitimate to wonder about the impact the implementation of activities based on the BTES findings will have on the elementary school principal and what role the principal can play in those activities. Some obvious behavioral implications for principals emerge: for example, the principal can maximize Academic Learning Time by refraining as much as possible from interrupting teachers with announcements and requests and by backing the teachers' attempts to enforce discipline in the classroom. Principals can make provisions to provide sufficient inservice training when needed.

It is the thesis of this chapter, however, that much more is required of principals if ideas from BTES are to be used successfully in classrooms; indeed, the principal's leadership is absolutely critical to the use of BTES findings. In the latter sections of this chapter, I will discuss the various components of the principal's behavior that are important. But before proceeding, I wish to make clear some assumptions I have about BTES and to describe my view of the principal's role.

A first major assumption is that the approach to teaching implied in the BTES is not readily practiced by most teachers. To be sure, much of what is reported in the study seems logical; e.g., the amount of student learning is related to time on task. But the implications of that finding are that steps are not uniformly taken to ensure favorable instructional conditions. As evidence, one can point to the wide disparity the researchers noted in the amount of time students spent on task from classroom to classroom. Similarly, I assume that the classroom management skills that would seem necessary to implement the BTES findings successfully, e.g., student-to-student monitoring or providing work for students that is within the "medium success rate," are not uniformly known or practiced by many teachers. This would imply that using related BTES concepts would necessitate revising, and in some cases reconstructing, the instructional practices and the accompanying teacher behaviors and skills.

What is more, elements of this approach may be philosophically unacceptable to some teachers. BTES does imply a causal relationship between a particular kind of teacher behavior and student learning. Although the philosophical underpinning of that implication is probably acceptable to many teachers, there are some who would subscribe to educational processes that they would consider more naturalistic or humanistic. Some will question the validity of the findings and the assumptions about human behavior that support BTES. Some would argue that BTES is too narrowly cognitive to warrant serious consideration as a means to impart the higher and more affective values for which the schools are responsible.[2]

In summary, I assume that many teachers will lack the requisite skills to develop activities based on BTES and that some teachers will doubt the validity of this study as a basis for restructuring teaching in their classroom.

This leads me to a second major assumption. In many schools, there will be a sufficiently large number of teachers who will lack requisite skills or will be so philosophically opposed to this approach (or both) that a decision to implement the BTES concepts on a schoolwide basis will result in a considerable revision of the school's instructional program. In those instances, the implementation process should be considered as an innovation in the school, and the research literature on educational change and innovation will be instructive in assessing the principal's role.

The Principal's Role in Applying the BTES Ideas

I turn now to a description of the principal's role in applying BTES concepts in the elementary school. The role can be divided roughly into three categories: substance, process, and support. .

By substance, I refer to the initial need for the principal to be thoroughly acquainted with the substance of BTES and knowledgeable about the implications the study has for the school, classroom, pupils, and teachers. I will identify this role as that of "knowledgeable colleague."

By process, I mean the principal's knowledge of the school as a social system and skill at implementing an innovation in the school. I will identify this role as "process monitor."

By support, I refer to the principal's responsibility for providing, as much as possible, those conditions, materials, and individuals that are shown to be critical to the successful use of BTES concepts in the school. I will refer to this role as "supportive leader."

These roles must be fulfilled in any elementary school that intends to implement an approach based on the BTES. Generally, these roles will be filled by one person–the principal. It should be noted, however, that there may well be instances where one or more of these roles are fulfilled partially or entirely by someone else in the elementary school building; e.g., an assistant principal or teacher. Perhaps a more accurate description of school leadership is to say that it is the principal's task to ensure that these roles are carried out successfully in the school by someone. I suspect that most elementary schools are sufficiently small that these roles are carried out by the principal. Thus, I will refer only to the principal's role in this chapter, while recognizing that it may indeed include more than one individual.

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[2] See the chapter by Frances Klein in this volume for an in-depth discussion of various philosophical views on the BTES approach.

The Principal as Knowledgeable Colleague: Substance

An all too familiar figure in the elementary school, and one that raises the ire of teachers, is the principal who encourages the introduction of some change or innovation in a school building but never takes the time to become personally familiar with or engaged in the innovation. Such principals, in the eyes of teachers, appear to be eager to latch on to some innovation not so much for substantial instruction reasons, but because the involvement of their school will make the principal appear innovative or progressive to his or her superiors. The principal in these instances effectively transmits a lack of commitment to the change he or she wishes the staff to implement.

An example of the consequence of this type of nonengagement on the part of teachers and principals would be the very limited implementation of the main features of the progressive movement in education and of the educational philosophy advocated by John Dewey. Much of what the progressive movement stood for and many of Dewey's ideas were not sufficiently understood; as a result, they were superficially and incorrectly implemented.

The BTES may appear to have little in common with the progressive movement in education. For purposes of this discussion, however, they are similar in that they both contain complex relationships and processes that can be improperly distilled down to a few simple practices. To the unsophisticated, an isolated set of practices might seem to be an accurate application of these theories, but in reality they might miss the very essence of what is needed. BTES ultimately describes a set of teacher behaviors intended to increase student learning, but its findings can be misapplied if they are not used with a thorough understanding of the study's intellectual underpinnings.

This being the case, it becomes critical that the principal assume the role of "knowledgeable colleague" in the school. To fulfill this responsibility, s/he should do the following three things:

1. Know and understand the BTES study thoroughly—the assumptions underlying the study, the study's research design and methodology, the findings, recommendations made by the study's authors, strengths and weaknesses of the study, and the

limitations those weaknesses place on the findings and recommendations.

All research studies, no matter how well conducted, are based on certain assumptions and suffer from methodological problems. The BTES is no exception. Perhaps nothing can contribute more to discrediting the BTES than an overzealous and misinformed push to implement changes based on its findings. The researchers are fully cognizant of the strengths and weaknesses of their work; those who attempt to use it should be no less informed.

Another reason why the principal should thoroughly understand this study is that s/he is the designated leader of the school and as such should be prepared to explain or defend the school's implementation plan and involvement in BTES to friends and critics alike.

2. Know the implications of the study for the teachers in the principal's school. A plan based on BTES could require teachers to have certain diagnostic, teaching, and classroom management skills. Presumably, the members of a school's teaching staff will differ in the degree to which they already possess these skills or are able and willing to acquire them. If these skills must be acquired by teachers to implement BTES findings, it becomes the principal's responsibility to orchestrate that effort. A common standard inservice program for all will not suffice. A plan must be developed that allows for a different level of skill development for each of the teachers—some will take intensive work, others may need little or no work, others may choose not to participate or may simply be incapable of benefiting much from further inservice training.

   It is likely that many schools will have to apply their BTES-based approach on a "broken front"; i.e., not all teachers will participate in this approach, and those who do will differ in the possession of needed instructional skills and in their ability to implement it successfully in their classroom.

3. Be willing to participate as an involved member of the faculty. The implementation of any educational innovation will cause frustrations, anxieties, and problems for some teachers. If they are to be willing to endure these problems, it is incumbent on the principal to know from firsthand experience what the problems are. Put another way, s/he owns the problem also!

One of the observations many educators frequently make about American elementary schools is that we have placed the principal in a full-time administrative position and removed him or her from the classroom. The degree to which this practice has lessened the principal's curricular and instructional role in the school varies from principal to principal, but in all too many cases the principal has abdicated instructional leadership as a matter of choice or necessity.

When this happens in schools that are implementing innovations, the principal limits his or her involvement to occasional classroom visits, or to shepherding visitors around to show them "how we are doing it." Such remote leader behavior simply will not suffice with BTES-based changes. What is needed is a principal who is fully engaged with teachers as a knowledgeable colleague in the classroom.

The Principal as Process Monitor: Process

Earlier in this chapter I stated my assumption that the teaching skills needed to use BTES findings may not be widely held by teachers and that, as a result, the adoption of a BTES-based approach on a schoolwide basis would require a considerable amount of change in the school. It follows that the introduction of BTES elements should be considered as an innovation, and the research literature on the implementation of educational innovations would, therefore, seem related to this chapter.

I should like to turn now to two major research studies on educational innovation and discuss the findings of those studies as they relate to this topic. The two studies are the I/D/E/A Study of Educational Change and School Improvement (Bentzen, 1974; Goodlad, 1975) and the RAND Corporation study of Federal Programs Supporting Educational Change (Berman and McLaughlin, 1975). These are comprehensive studies of educational change that should be read by anyone who is seriously interested in implementing educational innovations. From these studies emerged three critical findings that are related to this topic: the critical role of the principal in educational innovation, the importance of institutional ownership of an innovation, and the concept of mutual adaptation.

The critical role of the principal in educational innovation. Actually, this statement is a derivative of another assumption and finding from the I/D/E/A and RAND studies; namely, that the basic unit in educational innovation is the school site. Attempts to implement innovations from the national, state, or school district level have been largely unsuccessful if they have not viewed the school site as the essential unit of change. The principal, of course, is the designated leader of the school site, and it follows that s/he would play a critical role in implementing educational innovations. Time and again it has been demonstrated that if the principal is not committed to providing institutional leadership during the introduction of an innovation, the innovation will not be successful.

Ensure institutional ownership. By the term ownership, I refer to the degree to which the relevant faculty and staff members agree that a proposed innovation is important to their school and that they should dedicate their personal energies and resources to assuring its implementation. Perhaps one of the clearest and most consistent findings of both the I/D/E/A and RAND studies was the powerful effect ownership had on the successful implementation of innovation.

This, of course, is not a very surprising finding; indeed, it makes good common sense. What is more, I would guess that most principals, central district administrators, and State and Federal officials would readily agree to the importance of ownership.

Yet one constantly runs into situations where this fundamental concept is ignored or given improper emphasis. Often this happens, I suspect, because the innovator really does not believe that teachers are interested in or capable of appreciating the importance of a particular innovative scheme, or because the innovator is so zealous in his or her belief that the proposal is sound and "in the best interest of kids" that s/he cannot imagine how school colleagues could not support the concept as soon as they are properly "enlightened." The unfortunate result of this inattention to ownership is an educational landscape that is cluttered with the wreckage of unsuccessful innovations.

The principal's role in building institutional ownership is to develop a decisionmaking structure that allows those who will be affected by the innovation to discuss the proposed innovation openly, freely, and thoroughly and come to a collective conclusion about whether to and how best to adopt it. The exact way in which this ownership building process is accomplished will vary among schools. Some principals use general faculty meetings for this purpose, while others use faculty committees or school site councils or the informal organization of the school. Usually some combination of these approaches is used, and it takes time. A common error is to devote a relatively short period of time to this ownership building, secure a superficial agreement to begin, and then rush into implementing the project. Often a result of rushing into it is that when the teachers begin to encounter obstacles or problems, they begin raising fundamental questions that should have been resolved earlier. At this point factions develop and the cooperative spirit needed to sustain an innovation evaporates. [The reader is referred to the Dialogue, Decision, Action, Evaluation–DDAE–process in the I/D/E/A study (Bentzen, 1975).]

Many principals apparently find ownership building difficult. Teachers often report leader staff meetings as rituals where trivial matters are discussed and sensitive issues are avoided. I am unsure why this happens. It may be that some principals simply do not define their leadership style as involving teachers in these kinds of decisions; it may be impossible for others to find time to spend with teachers in this way; while others may simply be unskilled in working with teachers as colleagues. Principals who want to implement innovations in their schools successfully must develop the skills necessary to build the staff and faculty's ownership of the proposed innovation. Failure to do so will considerably reduce the chances of implementing the innovation successfully.

Providing for mutual adaptation. One of the most powerful findings of the RAND studies was the concept of mutual adaptation. (This concept was not identified in the I/D/E/A studies but was implied in the findings.) It means that in the successful implementation process both the innovation and the institution in which it is being implemented must change or adapt to each other for a proper fit. Schools are generally very similar in design and operation, but within that common framework important variations do occur. For example, schools differ in such important characteristics as age, teaching experience, and competence of the teachers; socioeconomic status of the pupils; degree of functional autonomy; and quality of principal leadership.

These variations can have profound influences on the way in which an innovation is implemented. In one school, some teachers may play a major role in providing inservice training to other teachers, while in another school teachers may have to receive all their inservice training from outside resources; in one school, it may be appropriate to implement a new approach in virtually all the classrooms, while in another it may be placed in only half the classrooms. In one school, the decisionmaking structure may be completely compatible with the development and maintenance of institutional ownership, while in another the entire decisionmaking structure may have to be revised before institutional ownership can be developed. The list of potential mutual adaptations is as endless as the variations one can find in schools.

The Principal as Supportive Leader: Support

As anyone who has tried to do something different or new will readily attest, considerable discomfort and anxiety often accompany innovative efforts. New patterns of behavior have to be substituted for older, more comfortable ones. Success at the new activity is often elusive, concepts and theories somehow never work out quite the way they were intended; skeptics are always anxious to say "I told you so" when your program or progress falters. Many of the teachers who use the BTES findings will encounter some or all these situations. In view of this, teachers need all the support and help from the principal that they can get if they are going to use BTES-related activities successfully in their classrooms.

Some of what has been written above about principal behavior can be described as supportive—e.g., providing appropriate inservice training—and I will not elaborate on those points further. For purposes of this discussion, I will characterize supportive behavior as being either internally focused or externally focused.

Internally focused supportive behavior. By this term I mean the manipulation of conditions, materials, and individuals within the principal's school so as to support as much as possible the teachers' efforts to implement their BTES-based approach. Many things might be identified by the principal and teachers as being supportive of the teachers' efforts: for example, reducing classroom interruptions by the principal's office during designated periods of time; strongly backing teacher requests for disciplining students who persistently interfere with a teacher's efforts; maximizing the flexibility of the school's schedule so as to allow teachers opportunities to visit other classrooms and school buildings to observe skilled colleagues; maximizing the use of the school's budget to purchase materials and other instructional aids deemed important by the teacher. It is recognized, of course, that the principal's degree of freedom to provide such supportive assistance will differ considerably from school to school. Some schools are beset by a large number of budgetary, organizational, and political pressures that severely limit the principal's flexibility; others are not so constrained and may have considerable room for movement.

Externally focused supportive behavior. This term refers to those actions of the principal that are addressed to parents, to the public, and to district level school administrators to gain resources and support for the staff's innovative efforts and to fend off attempts to limit the school's efforts.

During the introduction and implementation stages, special problems may develop that will endanger the innovative efforts. The principal will then need to exhibit supportive behavior on behalf of his or her staff and school. Some examples follow: the teachers may request supplies, instructional materials, or auxiliary teaching personnel that are above and beyond those which can be provided in the school's budget, and the principal may need to request additional budgetary support from the district office. In another case, some parents, community members, or indeed fellow educators may openly criticize and oppose the new approach and thereby jeopardize the continuation of the school's efforts. Many a promising innovation has prematurely failed because the program was inadequately defended or supported when significant opposition developed. It becomes absolutely essential, then, that the principal become a visible and effective supporter of the school's program and efforts.

Finally, the principal should fend off efforts by external groups to evaluate improperly or prematurely how effectively the school has applied the BTES findings. There are always those who demand instant success, and they will press for early positive evaluations as a condition for their continued support of the program. It must be realized that there are many conditions and interactions that determine the success of any innovation. It takes time for innovators to learn what does and does not work and to provide for mutual adaptation. It is the principal's task to defend his or her school against demands for early evaluations of the project. What is more, the principal should assure that those evaluations that are completed are not overly simplistic and that they fully account for the complexities of implementation of any educational innovation.

Implied in this discussion is the need for the principal to acquire some protection from the school district office. It is always difficult to be different. Fellow administrators (principals and central administrators) may view innovative efforts with little enthusiasm; they will give no support, or will even attempt to undermine the program. The principal simply has to fend off detractors and to sustain the school during crisis periods. In an effort to shore up defenses, principals and school districts might well consider the development of a consortium structure such as was used in the I/D/E/A League of Cooperating Schools (Bentzen, 1975).

At this point, it is important to note the critical role that district level administrators play in developing and sustaining their principals' risk-taking behavior. The tendency for complex organizations to limit their employees' willingness to try something new is well known. In school districts, the principals' conservative behavior is often a realistic response to their perceptions of the limited value central administrators attach to innovation. It is not likely that principals will take risks when they see the rewards going to those who "play it safe." If central administrators wish to encourage principals and their staffs to apply BTES findings, they will have to make it clear by word and action that they value risk-taking, that they will reward those who become engaged in change efforts, and that they will support principals if and when projects do not immediately produce expected results or when projects are faced with significant opposition.

Again, it should be noted that the likelihood that principals will be able to defend their schools successfully against external pressures or to procure additional funds will differ from school district to district. Even if the principal is unsuccessful in his or her attempts, just the fact that s/he is willing to put up a good fight will often serve as a motivating force for the teachers in the school.

Conclusion

This chapter has described the implications for the principal of implementing a BTES-based educational approach in an elementary school. A major assumption has been that techniques implied in the BTES are practiced in varying degrees by most teachers, and a considerable revision of the instructional program may be necessary in many classrooms. This being the case, the new plan should be considered an innovation, and the research literature in educational innovation is relevant to analyzing this topic.

The main behavioral implications for principals that were identified and discussed were:

1. The principal as knowledgeable colleague (structure)
    a. Know and thoroughly understand the BTES study.
    b. Know the implications of the study for the teachers in the principal's school.
    c. Be willing to participate as an engaged member of the faculty.
2. The principal as process monitor (process)
    a. Understand the principal's critical role in the innovation process.
    b. Ensure institutional ownership.
    c. Provide for mutual adaptation.
3. The principal as supportive leader (support)
    a. Provide internally focused supportive behavior.
    b. Provide externally focused supportive behavior.

Some will argue that what I have described in this chapter is a nice theoretical design, but the likelihood of anyone actually behaving this way is small indeed. The demands on principals, they may maintain, are such that strong leadership behavior is impossible in today's schools. I disagree. This kind of leadership behavior can be found in schools today, although, I fear, far less often than it should be. There are principals who provide this kind of leadership, and their impact on schools is dramatic. In the long run, I suspect that it all comes down to what a principal views as his or her priorities—instructional or administrative.

Of one thing I am quite sure: schools that attempt to use the BTES findings without a school leader who displays many of the kinds of behaviors I have described will probably not be very successful.

10

A Perspective in Curriculum and the Beginning Teacher Evaluation Study (BTES)

M. Frances Klein

The field of study called curriculum is broad and complex. Some of the scholars who have devoted their careers to the study of curriculum can agree on little except the importance of the field. The assumptions held and positions developed by one scholar in the field are rejected by another. The curriculum field has been pronounced moribund, and the suggestion has been made that workers in the field should abandon it (Schwab, 1970). Some scholars have stated that many of the current practices in curriculum are misdirected, undesirable, even unethical, and curriculum as a field of study needs to be completely redirected. There are those who are convinced that if efforts now being made are continued, significant progress in the education of young people will be made. The debates in this field have filled volume after volume as differing positions have been developed by scholars, each of whom is highly respected by many for his or her contributions to the thought and work of those involved in curriculum development.

As a result of my own study and work in the field, I have concluded that to use only one view of curriculum growing out of the work of the scholars is limited. Successful educational practice must try to draw on at least two different views if we are to accomplish what we hope to do in schools for and with our young people. Just how we can blend these two views in classroom practice is not clear, and much research is still needed. BTES certainly helps further our understanding of how one view contributes to schooling. I believe it is essential, however, to make clear in any discussion of curriculum the basic position and assumptions being made, and then to balance those with other needed positions and assumptions. That is the purpose of this chapter. I will discuss briefly two basic positions in curriculum and place my ideas about BTES and its importance within this perspective. I will suggest some possible areas for future research on the BTES model and will identify some implications for preservice and inservice education of teachers.

Conceptualizations of Curriculum

There are several different conceptions of curriculum that appear in the literature. Each of these can have a differing effect on classroom practices. Eisner and Vallance (1974) have identified five: development of the cognitive processes, the technology of curriculum, personal development, social reconstruction, and academic rationalism. Those who view curriculum as being largely the development of cognitive processes emphasize the basic abilities involved in thinking, which can be used in any future learning. Content or what is thought about in these processes receives far less emphasis than the processes themselves. The intent in this view of curriculum is to help the student develop intellectual autonomy.

Curriculum as technology is concerned with how to develop products and methods that will help students learn efficiently and effectively whatever they are intended to learn. This approach uses predetermined definitions of what is to be learned, from which specialists proceed to develop the technology of instruction needed to help students achieve the desired learning. It is concerned primarily with communicating knowledge and facilitating learning in efficient ways.

In the view of those who see curriculum as personal development, the emphasis is to assist all students to become self-actualized and autonomous persons. Content is important to the extent that it helps students in the process of personal development and liberation. Many diverse outcomes of learning are desired, and each person is helped to develop his or her own personalized curriculum.

Curriculum as social reconstruction emphasizes social goals—the betterment of society. Curriculums should help bridge the gap between the way society is now and how it ought to be. They also should help develop a better fit between individuals and society. Students study social problems and attempt to improve society through their work in the classroom and community.

The academic rationalists view curriculum as the attempt to enlighten students in the best ideas and objects produced in the past, using largely a Western perspective. Humankind's heritage is screened for those ideas that have been profound and long-lasting, and they become the basis of the curriculum. These ideas are to be found primarily in the organized disciplines of knowledge, and such disciplines are used as the basis for curricular design.

Pinar (1978) has identified three basic groups in curriculum: traditionalists, conceptual-empiricists, and reconceptualists. The traditionalists seek principles to be followed in curriculum planning and implementation and are very pragmatic in their approach. Their work is designed primarily to serve the practitioners in the schools. The conceptual-empiricists believe that a science of human behavior is possible and that curriculum is a subset of this science. They use the natural sciences as their model for study and, from their work, they attempt to create a science of curriculum. They search for knowledge that would be of greatest use to the practitioners. The reconceptualists attempt to develop new ways of viewing and theorizing about curriculum. They see their work as a creative intellectual task that should not be used—at least, not yet—as a basis for prescribing practice or generating a verifiable theory. They hope to evolve conceptual schematics that will offer new ways of viewing curriculum and explore how these might affect practice.

In my view of curriculum, I identify two basic conceptualizations of curriculum that ought to be used to direct classroom practices: behaviorism and reconceptualism. My groups are not very different from those identified by Eisner and Vallance (1974) or Pinar (1978). The reconceptualists as I see them are basically the same as Pinar's (1978), and they seem to combine the two groups which Eisner and Vallance (1974) described under the headings of self-development and social reconstruction. Pinar (1978) indicated that the term "reconceptualists" is somewhat controversial, but it does seem to best describe their primary effort. My behaviorists may be the traditionalists and conceptual-empiricists as described by Pinar (1978) and the curriculum technologists, academic rationalists, and adherents of curriculum as cognitive processes identified by Eisner and Vallance (1974). The label of behaviorists makes clearer to me their assumptions and practices, however. Behaviorists draw heavily on the behavioral sciences in their search for principles of curriculum development. These two groups of scholars in curriculum—reconceptualists and behaviorists—hold different views about the purposes, the processes to be used, and the desired results of curriculum development. They start with different assumptions and value positions, and the curriculums they influence are very different. In the following paragraphs, I will discuss selected dimensions for distinguishing between these two groups. These elements are also those that appear to be particularly related to the BTES study.

It should be emphasized that within each of the two groups of the reconceptualists and the behaviorists different subgroups can be identified among whom there is substantial disagreement. The use of the two labels masks the differences within each group, but it does allow for a broad comparison between two groups. Each holds similar general views on what curriculum ought to do and how it should do it.

The behaviorists advance a conception of curriculum based on a clear statement of predetermined outcomes of curriculum and on careful planning of the means by which these ends will be achieved. The rationale for developing curriculums described in *Basic Principles of Curriculum and Instruction* by Tyler has done much to help establish the acceptance and popularity of this conception. In his monograph, originally written as a syllabus for a graduate course in curriculum and instruction, Tyler raises four questions that must be answered to have a comprehensively planned curriculum:

> 1. What educational purposes should the school seek to attain?
> 2. What educational experiences can be provided that are likely to attain these purposes?
> 3. How can these educational experiences be effectively organized?
> 4. How can we determine whether these purposes are being attained? (p.1 2).

The behaviorists view education as planned changes in behavior, which is broadly defined as thoughts, feelings, and actions. These planned changes are stated clearly and succinctly as behavioral objectives, and the development of behavioral objectives is seen as one central task in curriculum development. Often behavioral objectives reflect a sequential approach to learning where one objective builds on a preceding one. This sequence ultimately should lead the student to developing more complex behaviors. Instruction is planned and conducted so students will achieve the desired behavioral objectives. Objectives become the focus of classroom work. Evaluation in this view of curriculum focuses on the development of procedures and instruments that measure the extent to which the student has attained the objectives.

Planning prior to classroom instruction by the teacher is emphasized, although the teacher has direction and help from many others such as the State, community groups, students, and district officials. The teacher is, however, the key decisionmaker. The role of the teacher is to be in charge of instruction and the classroom and, hopefully, to be an expert in the subject matter to be taught.

Behaviorism is an approach to curriculum development that has been studied and practiced widely. Part of the extensive use of behaviorism comes from the fact that it is compatible with a number of strong current societal trends such as accountability and the emphasis on "back to the basics." It is a rational, logical conception of curriculum development and draws heavily on the modes of planning and inquiry characteristic of our technological-industrial-scientific society.

The reconceptualists, however, reject outright the behavioral approach to curriculum development and propose an alternative. Some of the reconceptualists tried to answer the basic questions raised in the Tyler rationale (1949) but wanted to give them different answers than are typically given. They abandoned this approach because they recognized that they must begin with an entirely different conception of curriculum (Macdonald, Wolfson, and Zaret, 1973). They do not believe that the means-end approach to curriculum planning is the only or best one. They do not believe learning, teachers, or students should be controlled and constrained by the use of behavioral objectives. They do not accept the dominance of the teacher in planning and implementing curriculums, and they do not accept standardized testing and other objective procedures to measure what the student has learned as the primary way to evaluate learning. Not only do they reject these ideas as undesirable; they consider them to be unethical.

The reconceptualists emphasize self-actualization and the development of an autonomous person as the primary purpose for developing curriculums. To them, this approach suggests much freedom, although with structure for each student to be the prime decisionmaker about his or her own curriculum. They believe that what is learned from the curriculum is unique to each individual and cannot be determined prior to the actual engagement in classroom activities. Many diverse outcomes are thus expected and desired as a result of experiencing curriculums. The reconceptualists use a holistic approach to learning rather than a reductionist approach of breaking down what is to be learned into a series of sequential steps. They emphasize the need for a clear statement of what one's values are about society, education, and individuals as basic to curriculum development so as to be sure these values are manifested consistently in practice.

The quality of the educational environment and of life in the classroom also are identified as basic concerns in curriculum development. The reconceptualists propose activities and time in the classroom that permit students to explore ideas and problems freely, to integrate what is learned from those explorations into a tentative personal perspective; and to transcend those tentative understandings to arrive at a personal insight and set of meanings. The role of the teacher is defined as facilitator and co-inquirer along with the student into significant ideas and problems. Self-evaluation by teachers and students is emphasized, along with social accountability in relation to directions and purposes agreed on through wide participation by many groups in society (Macdonald, Wolfson, and Zaret, 1973).

BTES in a Curriculum Perspective

Given these two conceptions of curriculum, which one does BTES more closely agree with, and what helps to make it an important study? BTES is complex and, as such, is difficult to categorize completely as portraying only one perspective of curriculum and not the other. Some elements of the study seem to draw on the positions of both the behaviorists and the reconceptualists to some degree. In my view of the study, however, the behaviorist position was used much more consistently than the reconceptualist. Thus, the contributions of the study will be to further our understanding of classroom practices based on behaviorism.

Although the research in BTES is not clearly labeled as behaviorist, that aspect becomes apparent when the dimensions used to describe the research are examined. The model is primarily concerned with academic pursuits and suggests ways in which classroom time and activities can be used to maximize achievement of predetermined outcomes: sequential skills in reading and math. Although BTES recognizes the importance of student attitudes toward school and subject areas, it does not give them the prominence that it gives academic pursuits. In BTES, the teacher is in control of the classroom and is the primary decisionmaker. Tasks on which students spend time are well defined and primarily identified by the teacher, who needs to be knowledgeable in that subject area, particularly for the diagnosis phase of the model. Objective evaluation procedures are used to measure student achievement of reading and mathematics skills and understandings.

By contrast, it is clear that there is not much freedom for students to be the primary decisionmakers, and teachers are not co-inquirers. Classroom activities are not developed so students can freely explore ideas and problems to gain personal insight, integration, and transcendence of what is learned. Self-evaluation by teachers and students is not discussed in summaries of the research.

Some goals of curriculums—such as development of communication skills, basic understandings of subject matter, and development of cognitive skills—would seem to be compatible with the use of the BTES model. The basic teaching functions of diagnosis, prescription, presentation, monitoring, and feedback and the concept of active learning time[1] as developed in the BTES research do much to help us understand how to design classroom practices so we can attain goals such as these. At the same time, however, it must be recognized that there are curricular goals that may not be developed as effectively, if at all, using only one conception of curriculum. Developing autonomous, self-directed, creative students who can plan and implement their own learning purposes and activities throughout their lives, who develop a unique and personal perspective on their learnings from classroom activities, and who are aware of their own and society's values is, like other such possible outcomes, very desirable to many. These types of learning outcomes may be more effectively developed if practice is based on the reconceptualist view of curriculum. I believe that this in no way limits the contribution of the BTES study, but it does help place it in a curriculum perspective. Clarifying the study's position regarding curriculum makes it easier to identify some factors that help account for its importance. It also raises some questions for further research and suggests some essential components of curriculums for the professional education of teachers.

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[1] I prefer to use "active learning time" rather than "Academic Learning Time," which has been used elsewhere in this publication. It is my belief that most subject areas of the curriculum can use the concepts developed in this research as effectively as can those which are sometimes referred to as "academic" subjects, as opposed to "nonacademic" subjects. Such a distinction may prove to be artificial and limiting in future research.

Many respected curriculum researchers and practitioners subscribe to the behaviorist view of curriculum, and it is the model teachers are generally taught. Many educators and legislators at the State and Federal levels also follow behaviorism in curriculum decisionmaking. This makes BTES compatible with other important work in the field and gives it added importance to the profession. It is a significant study that extends our understanding of one conception of curriculum and possible resulting practices and benefits. The concepts and processes that BTES examines should help improve practice designed to achieve certain desirable learning outcomes by students.

It is significant for other reasons, also. It is a carefully conceived and rigorously implemented study by highly competent researchers. Therefore, what was selected for study and reporting were those concepts central to the behaviorist view of curriculum. It is a longitudinal study, with the various stages extended over 5 years, a longer time span than educational research can normally afford. Rather than studying the teaching of a specific lesson in a limited time, the researchers studied successful teachers, students, and classroom practices over a long time, analyzing carefully what contributes to one type of success in schooling and what interferes with it. The study did not occur in a quiet laboratory reserved for studying teaching and learning; it occurred in real classrooms, each with a teacher, students, and an ongoing educational program. This factor surely compounded the difficulty of the researchers' work, but it contributed significantly in developing an understanding of some of the successful practices of schooling.

The BTES model is not a simplistic explanation of complex phenomena. It is a model with interactive components that will be modified by varying classroom situations. It has some limitations, and it is not presented as a finished product. The model clearly is not fully understood and must be extended in future research activities. The importance of the model undoubtedly will grow as further research is conducted on it and as practitioners examine its relevance and possible variations in different classroom situations.

Possible Areas for Future Research

There are at least four areas relating to the use of the BTES model in curriculum development that suggest the need for future research:

1. How applicable it is to affective goals in reading and math and to goals in other areas of the elementary school curriculum?
2. How effective the model is at other levels of schooling, and what adaptations may be needed?
3. The ways in which the BTES model can be adapted to the constraints and uniquenesses of different local situations and still remain effective.
4. The extent to which the BTES model can be used effectively in classrooms along with conceptions of curriculum such as the reconceptualist view.

The findings of the BTES report and other studies strongly suggest the usefulness of this model if achievement in reading and mathematics is to be maximized. It probably was not by chance that these two areas were selected for study in the BTES research and by many others. Reading and math skills certainly are considered by most people to be essential components, if not the core, of the elementary school curriculum. Research on them is particularly timely in view of the current emphasis on "back to the basics." Both subject areas have a structure and developmental sequence that many curriculum planners have defined with some similarity: addition is taught before multiplication; sounds of single consonants and vowels are taught before blends of letters and syllabication. This would assist the researchers considerably in deciding how to define student success. Students who achieve competence in the sequence of skills are successful.

However, the BTES examination of math and reading achievement represents a limited number of goals and objectives—those primarily concerned with cognitive skills. Affective goals in these subject areas—such as appreciation of good literature, valuing reading as a leisure time activity, and appreciation for the structure of mathematics—were not studied. They are often stated, however, in comprehensive curriculum plans and are usually considered to be desirable outcomes of any curriculum in reading and math. The extent to which the BTES model can be used in developing these affective goals is not known. Different classroom activities and climates may be needed to help students achieve them. Right answers and appropriate feedback are not as clearly apparent for these goals as they are in the cognitive skills in reading and math. To attain such goals might require the use of alternative models generated from other conceptions of curriculum such as the reconceptualists'. The BTES model and other models need to be studied in future research to determine which can assist most effectively in the development of affective goals in reading and math.

The use of the model, and others also, must be explored in relation to the many and varied goals often stated for other subject areas in curriculum—social studies and science, for example. The extensive amount of variation to be found in the goals, objectives, content, and instructional strategies within different curriculums in these subject areas presents fertile ground for further research on the BTES model. Would the BTES model be equally applicable for such social studies goals as clarifying values and developing good citizenship, or would other models be better in helping attain them? Quite a different model, based on Lawrence Kohlberg's research on moral development, has been proposed to help students clarify their values and examine the impact of value positions on human behavior (Guidance Associates, 1972). In this model, the teacher asks questions primarily to raise and support all sides of a moral dilemma. There are no right or wrong answers; any opinion given by a student is accepted as a basis of discussion and is used to challenge the students to think about what they would do in a moral dilemma. This strategy does not use the basic teaching functions as defined in the BTES study. Which models or combination of models to use in helping students clarify their values is a question that needs to be explored in future research.

There would seem to be areas in social studies and science, however, where the use of the BTES model would be very appropriate. To understand and use the concepts of latitude and longitude and to know and apply scientific laws and principles are examples of goals that probably could be taught and learned most effectively using the BTES model. The application of the findings of this study to other subject areas in the curriculum also needs to be explored in future research and practice.

Underlying my suggestion of future research in other curriculum areas is my desire for a balanced curriculum in the elementary school. Some research has suggested that curriculum in the primary years of schooling consists almost exclusively of math and reading, with very limited attention being given to other subject areas (Goodlad, Klein, and associates, 1974). In the view of some, such a focus is desirable; to others, it is not. If the elementary school curriculum is to implement such varied goals and objectives as are usually stated, however, I believe it will need to include essential subject areas in addition to reading and math. What model or models can most effectively and efficiently guide classroom practice to achieve all the goals of a comprehensive school curriculum must be determined through future research.

Another question that needs further exploration through research is the extent to which the BTES model might be used at other levels of schooling and what adaptations might be needed. For some classes in the secondary schools, for example, it might be very useful. For other classes, however, different models may be needed, just as at the elementary level. Secondary teachers work under very different conditions from elementary teachers, and the model might need to be modified to be used at the secondary level.

Similarly, the extent to which the model is applicable at the college level must be investigated. Collegiate education occurs under different conditions from both elementary and secondary schooling. It would be presumptuous to assume that the model as we now understand it is equally applicable at any other level of schooling. For example, one possible modification of the model at the upper levels of schooling might be different definitions of appropriate success rates for learning tasks at these progressively more mature levels. Perhaps a different balance between easy and difficult tasks is needed for different levels of schooling. All these possibilities must receive careful study.

A third aspect of the model that suggests further research is the variation within the concepts that may be required by differing local situations. Schooling occurs throughout the United States and within the State of California in widely differing situations: for example, urban, suburban, and rural areas; wealthy and poor districts; high, middle, and low socioeconomic communities; mixed racial and ethnic groups and racially and ethnically isolated groups of students; classrooms with experienced and inexperienced teachers. The research already suggests that variation can occur within components of the model—ways in which engaged time can be maintained by contact with the teacher, aides, peers, or materials, for example. The extent to which local variations will require modifications within the model for maximal usefulness must be explored carefully and systematically for each of the components of the model as must their interrelationships within the various levels of schooling.

I have suggested the possibility that at least two models are needed to achieve the array of goals usually stated in a comprehensive curriculum. This suggests a fourth area for future research: the extent to which several models, developed from very different conceptions of curriculum, can be implemented in the same classroom or level of schooling and still maintain some continuity and consistency for the students. Researchers typically use primarily one model or another to guide their activities. Rarely has the use of several models at the same time been explored. Will the use of several models with a single group of students be confusing to them and cause conflict in what might be accomplished? Or can several models be used effectively to help students gain different but equally desirable benefits more efficiently from their schooling? This is a basic question that must be studied carefully in the future.

Implications for Professional Education

The BTES model is a powerful set of ideas that all professional educators ought to study. The concepts used and the findings of the research on the model must be included in professional education. It represents one possible way in which schooling can be improved, and such ideas are always needed.

How professional educators learn about the BTES model is extremely important. Its impact will be greater if they learn about it in several ways: through printed matter, discussions, audiovisual materials, demonstrations, and guided practice. Reading, discussing, and using audiovisual presentations are the traditional ways of educating about ideas, and certainly these techniques will facilitate learning about the BTES model. Learning about the BTES model, however, must not stop there. A powerful instructional technique is modeling or, more popularly stated, practicing what you preach. Modeling will provide an opportunity to observe and experience the BTES model in practice in classrooms. This technique should occur in classrooms in both schools of education and public schools. The BTES model will have a far more limited impact than is desired if classrooms where professional skills, knowledge, and attitudes are taught do not exemplify it for part of the instructional time. Through their teaching, university professors in schools of education can provide students direct experience with the model. Their understanding of, commitment to, and practice of this model as part of the curriculum for professional educators must be provided for in any effective dissemination plan.

Teachers and other educators must also be provided the opportunity to observe the model in operation in a variety of public school classrooms using all the possible options and variations included in the model. The model is not a narrow, rigid specification of what must be done in classrooms. It allows for a variety of possibilities in a number of its components. Educators must observe all these possibilities and their interactions as part of the professional curriculum to avoid the notion that there is only one way to implement the BTES model.

Finally, the professional educator must have an opportunity to practice using this model with the guidance of people who are knowledgeable and experienced with it in a variety of settings. As educators receive direct and immediate help in diagnosis, prescription, feedback, and monitoring in differing situations, the model will become a meaningful part of their professional repertoire of skills and knowledge.

The behavioral conceptualization of curriculum, made more precise by the BTES study with all its complexities, strengths, and limitations, should be one major component of professional education at any level. It should not be the only model, however. Others also exist, and more undoubtedly will be developed in the future. How they can be used to help achieve curricular goals also must be a part of any teacher education curriculum. As part of their professional preparation, educators need to be made aware of all available resources that can help them meet the demands and problems of schooling. The conceptions of curriculum presented in this chapter as well as others developed in the future should be critically examined in professional education for their applicability to the problems of schooling. No one model or conception is likely to help the schools attain all the goals and expectations usually stated by those concerned about educating young people. To single out one model as the only model to be used is likely to exclude some of the expectations we have regarding schooling.

There are many other skills, areas of knowledge, and attitudes needed by professional educators beyond those suggested here. This chapter has focused broadly on what is needed in planning and implementing curriculums. Classroom management skills, human relations skills, and competence in subject areas, for example, must also be in the curriculum of educators. The need for such a comprehensive professional curriculum raises an ever-present problem in curriculum development: how can time be provided to teach what is considered essential? The final report on the BTES states that the model will not be easily or quickly taught. And still there are other areas of knowledge, other skills and attitudes that must be included in the preservice curriculum for teachers. When and where are teachers and other professional educators going to learn all that they need to know? The amount of time devoted to preservice education for teachers is very limited.

This dilemma points up the importance of inservice education and graduate work for advanced degrees in professional education. The limited time that can be devoted to preservice education makes the continued education of teachers essential. Responsibility for this continued development of needed skills, knowledge, and attitudes must be shared through inservice work in school districts, university courses, and efforts of other professional groups. This challenge requires careful planning and delineation of responsibilities among the groups who must help prepare educators to meet the problems of schooling. It is an awesome, but critical, task for the future.

11

A Teacher Implements Instructional Changes Using the BTES Framework

Raquel Muir

When BTES began, I had been teaching for 12 years in a district that had openly and forcefully adopted a policy of individualized instruction. Instructional materials, workshops, and teacher evaluations totally embraced the concept of individualized instruction. From the beginning of my teaching experience, I was expected to create individual learning opportunities in all subject areas. Small, smaller, smallest units of instruction were considered beautiful and productive. Heterogeneous classrooms were established in all schools to ensure individualized instruction.

My interest in the Beginning Teacher Evaluation Study was initially stimulated by the findings of the part of the study conducted by Educational Testing Service. The design and instrumentation of the study indicated that researchers were at last beginning to recognize the complexities of teaching and the value of studying normally operating classrooms. The findings were simply hypotheses to be further explored, but they offered stimulating challenges for teachers to think about in relation to their own classrooms. I was intrigued by classroom practices different from mine that were reported to be related to higher achievement on standardized tests as well as on tests developed for the study. The findings on the use of materials and groupings for math and reading at the second- and fifth-grades appealed to my common sense, even though some were contrary to my practices. As a sixth-grade teacher who had taught from grades two to six in a variety of combinations of grades or ages of pupils, I was comfortable in considering that fifth-grade practices could have a logical extension for sixth-grade practices. All the findings, combined with my active interest in educational experimentation and change, led me to follow the study with increasing interest.

Research in Real Classrooms

The BTES design of studying regular classrooms with a full complement of students for an extended period of time also appealed to me. Having conducted a year-long study with a regular classroom of 30 students several years before, I was well aware of the difficulties and advantages of such a research design. The thread of common sense and the validation of some intuitive perceptions about teaching and learning that have been around for a long time began to emerge. Some concepts suggested teaching techniques completely opposite to the highly accepted and endorsed individualized approach I was using.

As a classroom teacher I have become increasingly wary of quickly adopting new programs or even new instructional materials just because they are "fresh, new, and appealing." Furthermore, I have been reluctant to implement curriculum programs and their related materials in which I have had no opportunity for choice or evaluation. The research base for almost all such programs is limited or nonexistent. On the other hand, in all fairness, my own instructional program was based on the district's policy of individualization of instruction and on its definition of the terms.

The issues raised by the BTES study offer stimulating challenges for teachers to explore while suggesting a tool that can be useful to help them monitor student learning on a daily basis, if they so desire. Instead of running counter to intuitive notions of good classroom practices and knowledge of children and their behaviors, the BTES research offers a refinement of the art of teaching, and encouragement and support to stimulate creativity in a teacher. Who could turn down such an exciting prospect?

Soon after my introduction to BTES, I was appointed to the Commission for Teacher Preparation and Licensing (CTPL) in the State of California. CTPL was responsible for developing and administering the study as well as for subcontracting for the services of its Educational Testing Service and the Far West Laboratory for the actual research design and study. Because of my interest in BTES, I was appointed to the research committee directly involved with the study.

Researchers and Teachers—A Team

I had an excellent opportunity to observe and listen to the researchers in action. There were hours of debate between members of the research community on design, validity, and reliability. So many caveats were recommended that the research would be almost useless if all were adopted. It was obvious that the study needed the researchers and all their diverse views and design expertise, but it became apparent also that even highly respected psychologists and research teams need teachers to help them understand some of the complexities and dynamics of a classroom in full operation.

About 1975 my interest in BTES and the emerging experiments became so intense that I decided to ignore some of the early advice of the research advisory board and "play" with some of the concepts developed in the beginning of the study. In no way did I intend to conduct a research study; I simply wanted to take some of the more practical findings and try to determine if some of the fifth-grade practices would transfer successfully to sixth grade.

For me, a powerful issue raised by the study was the indication that greater amounts of direct instructional time were correlated with increased student learning. As the results began to emerge and the concept of ALT was developed, the issue became more complex as it specified pupil behaviors and teacher skills. The final definitions of allocated time, success rate, time on task, and the family of teacher practices related to increased ALT were less clear and tidy as I began to try out some of the possible implications for teachers. I used diagnosis, prescription, presentation, monitoring, and feedback to individualize my instruction, as I always had. How could I continue to use these concepts of teaching and give instruction to larger groups or even the whole class for math instruction? The concept of heterogeneous groups versus homogeneous groups emerged. I found myself asking questions about and finding a challenge to my style of individualized instruction. I was beginning to ask: "Is it possible that instruction in math and reading may be too individualized? Is it possible that there can be a blend of large group or even whole class instruction and individualized instruction? Are there elements of individualization that are distractors to time on task, even though they are theoretically educationally sound? Have we as educators been sold the concept of individualization too strongly, to the exclusion of other instructional patterns?" I saw tension and conflict, but also I saw intriguing possibilities.

The Context of the District

The climate for individual classroom experimentation in 1975-76 in my district was essentially neutral. The focus of administration was on impending collective bargaining, maintaining individualized instruction, writing behavioral objectives, and raising test scores through specified instructional programs. I was not able to generate more than mild interest in the concepts of BTES. Having been judged outstandingly competent as a classroom teacher by the Stull evaluation procedure, I felt free to experiment with BTES.

Basic questions emerged immediately. How could I increase direct instructional time for everyone in the class? Could I reorganize my math materials and acquire new techniques for teaching the class as a whole at the same time? Could I resolve the conflict between the issue of individualized instruction and greater amounts of time on task through whole class instruction? How long could whole class instruction effectively keep most students on task?

Philosophically, I did not have any trouble attempting to increase direct instructional time at the expense of other activities such as games or unrelated center activities at the sixth grade. My observations over the years have suggested a strong correlation between academic competence, self-concept, and a liking of school. In addition, my experience has been that students with stronger academic skills have tended to be more self-directed and often have helped to chart some of the learnings for the class. BTES suggested to me that if I could increase students' learning through more ALT, perhaps I could also have some influence on self-concept and attitudes toward school, as well as on academic competence. Despite all the caveats on ALT, I decided that it was terribly important for me to see if I could bring any of this about in my classroom. I simply could not wait for everyone to agree to disagree or agree to agree on the research and the final findings.

The Experiment Begins

I began my experimentation with some ideas emanating from the research in midwinter 1976. The class was composed of 32 students—20 boys and 12 girls. The school population was drawn from a middle- to low-income area with full integration of all minority groups. Achievement rankings of the school were reflected in my class and were below grade level at least 6 months to 2 years or more for both reading and math. The school had the Early Childhood Education project and the Title VII Bilingual project, but the upper grades (4 to 6) had no project, no aides, and no funds for supplementary services or materials.

Allocated time for math was 60 to 70 minutes per day, with a success rate ranging from 40 to 80 percent on moderately difficult materials. I devoted a minimal amount of time to reviewing concepts except through cumulative teachermade tests, which I gave approximately every 2 weeks. There were five math groups based on concepts and skills plus three students whose skills were not suitable for any of the established groups. These three were on separate tracks with special materials appropriate for their levels—all low. My observations of the students' time on task without direct instruction was embarrassingly low when I focused my attention on that facet of my program. Transition time between groups was often slow, and it generally disrupted the entire class when one group moved around. However, the students worked well with me for group instruction and for about 10 to 15 minutes after their return to their own seats to do the followup assignments. After that time had elapsed the class was not necessarily noisy, but I observed that they were often not engaged in math or academic tasks. It was obvious the period was too long for some, yet how could I have small groups and get to each group any faster for any kind of meaningful instruction?

This particular class had 20 boys who were very active. Several had physically aggressive behaviors. Discipline problems with several of these students were frequent when I was not working directly with their particular group.

The class coverage of the math curriculum and the level of competence was sufficiently advanced by midwinter that it appeared a good idea to undertake the new instructional pattern using a review of concepts.

I explained to the class about the research being conducted and why I wanted to try a new way to teach math. I suggested it might even be more fun for them. As a class they agreed to try out the change, and we discussed what would be the necessary behaviors for everyone if the plan were to work.

The first few days of the 45-minute teacher-directed instructional time with 10 to 15 minutes of independent followup were dramatically successful. Behavior problems disappeared. Everyone appeared to feel challenged, yet not overwhelmed. All the students were working on materials and concepts that were within their capabilities for achieving high success or at least some success for those with few mastered concepts. The challenge was not only for the correct response to a problem, but speed and accuracy to the best of each person's ability. I responded with above average amounts of positive reinforcement because I felt it was truly earned. An individual recognition system for effort and "being on task" began to evolve.

I found that, as a teacher, I was concerned with presenting the concepts and giving positive reinforcement for the responses I wanted from the students in terms of effort and accomplishment. But I also had to be highly sensitive to the physical and emotional behaviors of the class. At first I was only remotely conscious of ALT as a concept. Instead, I was busy with my sensitivities toward how many students were working. How long could I keep on with the concept and how many examples did we need to compute to make certain the concept was learned? How successfully was each student learning during the lesson? I have heard from other teachers that teaching the whole class is the style for the teacher who does not want to work too hard. I found the absolute opposite to be true. Although it was exhilarating for both the class and for me to experience the feeling of everyone working independently, yet together, like an orchestra, it was tiring–no, exhausting.

Fresh Insights on Instruction

After about 10 days of the new pattern, the children became aware that they too were covering more material and were working harder and longer than they had under the previous pattern. Some children in the slower groups who had been on individualized programs most of their lives worked harder than I had ever seen them work. The opportunity to do the same work as the whole class seemed to motivate them. Although their speed and accuracy were not as high as those of most of the class, the idea of flying with the whole class seemed to keep them trying. I had expected some students to become bored with the practice material and the reviewing of concepts, but they appeared to respond to the challenge for speed and accuracy. Many expressed pleasure as they could see their increased speed and accuracy in computation. Other children said that they liked the new plan because it gave them a change and a chance to practice skills so they *really* understood what they were trying to do. Many showed a willingness to suggest topics they would like to have retaught. With encouragement from me, the students helped chart their needs and instructional tasks and indicated to me in a variety of ways that it was time to move right along.

The Conflict–Individualized and Large Group Instruction

On the other hand, lest the reader think that all was sweetness and light, there was a growing resentment within the ranks of the students that the amount of time they were being held on task for math was too much. The number who grumbled and resisted and verbalized was small, but they became clearly disruptive for the instructional period. They missed the opportunity of "messing around" when other groups were meeting. Some did not experience the success rate they wished to achieve (100 percent all the time with little or no effort). Some simply did not want to give up the small group instruction and the comfort of being able to ask for help with only a few other students knowing what they did not know.

Still, at the end of 2 weeks I would have said that the new plan of large group instruction was a success and was here to stay. The students' time on task as a whole class had increased. The room was quiet and intense with the atmosphere of effort from each student–an environment teachers recognize and find rewarding. The environment was serious, with even the "class clown" involved. The spirit of cooperation appeared contagious. It was as though the same behavior patterns present for small group instruction around a table existed for everyone in the classroom. With the large group instruction, small groups no longer had to move to the instructional table for instruction, as before–one less distraction for ALT.

The tensions between small group and large group instruction began to emerge as we moved into new concepts to be learned. Within the heterogeneous classroom the range in readiness for sequential concepts was great. New learnings were too hard for those without appropriate mastered skills. For those with advanced skills, the presentations necessary for large group instruction were sometimes too labored and long. The students began to exhibit impatience with the pacing. I discovered I changed my teaching style as well as materials and concepts in small group instruction. While large group instruction offered the advantage of monitored practice on varying levels and introduced concepts, small groups allowed me to be flexible in pacing, style, and level of concept difficulty.

Experimentation with the whole group instructional pattern gave me some indication that I could move through concepts faster than I had and could give greater amounts of spaced practice for mastery of the concepts, once they had been introduced with small groups. Removal of distractions such as groups moving to and from centers or groups engaged in activities not directly related to assigned math work increased the total time on task for the class. My availability to move about the room to reinforce on-task behaviors and to provide immediate feedback appeared to increase ALT and served as a great motivator to students. A general procedure of leading the large group through sequential problem-solving operations with assigned practice material at an appropriate level of difficulty appeared to be a successful teaching strategy. It enabled me to give frequent feedback, even for a small number of problems for each student, an important advantage. Small group instruction did not lend itself to this same kind of immediate feedback except during the time that I was working with each group.

I experimented with different levels of instruction, different positive reinforcement techniques, alteration of the allocated time for math, style of presentation, diagnosis of each child's level, and whatever variable appeared to intervene on the scene that seemed to change day by day. ALT swung from a dramatic high to a dramatic low about 3 weeks after the outset.

I was learning! An "either/or" attitude on my part—either completely individualized or all large group instruction—was not necessary. There were advantages to both patterns. I began to seek a way to use the best strategies of each. Gradually, as I altered the pattern once again, ALT began to increase again.

The Compromise

It was apparent that I could not hold the entire class for the entire math period every day. I decided after the 4th week to shift back to the small groups for 2 or 3 days per week and to use the total class instruction for the remainder of the week. The small groups were reorganized, but no one was on an individual program. I established a pattern of testing that was a bit different from the previous model. Every other week each group had a different teachermade test, and every 3d week the entire class had a new teachermade test that was a comprehensive review of all concepts taught previously both in small group and whole class instructional periods. The pattern began to emerge as a happy compromise. Total class instructional periods were pleasant but intense, with high ALT. Smaller groups appeared to meet the individual needs and were helpful in covering concepts initially. ALT was high within the instructional period, but ALT for independent seatwork dropped at times without my monitoring time on task except from the instructional area.

Appropriate Materials

The greatest difficulty I faced was obtaining materials in sufficient quantity to be useful for the entire class at levels appropriate to obtain high success rates. If the tasks were too easy, the material did not seem to encourage adequate effort and carelessness developed. Obviously, the opposite was also true, but for different reasons: if the tasks were too hard, the students simply either guessed wildly or made no attempt at all. I tried to avoid this mistake. The children finally accepted my frequent admonition that it was "okay to make a mistake, but not the same one over and over." A few mistakes were all right while learning was going on, but too many perfect papers apparently said to my students, "I'm doing this so well I don't need to work very hard at it. It is so easy I won't try." In my classroom the highest level of engagement was produced by work of medium difficulty, with occasional high difficulty work to whet their appetites to learn new things.

Attitudes toward math were far better for this class at the end of the year. The students made exceptional gains in math on the year-end achievement test in May. Needless to say, they were delighted with themselves. Their behaviors and attitudes toward math had changed a great deal. I had changed the structure of the math instructional program and was confident and comfortable that the students were learning more. I thought consciously about ALT and how to increase it for math.

I was pleased to have experimented with the BTES concepts in math. ALT had not evolved as a named concept, but I had proved that I could increase direct instructional time for math. However, I also knew I had to be ready to respond to class needs, interruptions of schedules, and other variables.

Same Time Next Year

My next class consisted of 28 students–19 girls and 9 boys. The economic and ethnic balance of the class and school was shifting to more minorities and a rapid turnover of students during the school year. This turnover was a marked departure from the past for my classes. The girls in the class did not like math and said so at the beginning of the year. Having survived the year before with the new pattern of math instruction I found it far easier to use at the beginning of this year. This group did not have the opportunity to discuss whether they wanted to undertake a change. I set standards for effort and behavior cooperatively with the class because I wanted to start this group with the new procedures as their accepted method. However, I definitely guided the results. ALT increased as the standards were met. With a greater amount of ALT, content and coverage were faster. By midwinter the girls almost grudgingly stated their opinion that "math is really fun, and I can do it better this year." While the procedures were easier to follow than the 1st year, I found that my own tasks of remaining sensitive and responsive to the pupil behaviors remained as critical for this class as for the previous one.

Trial and Error Crucial

I made some of the same mistakes again by having expectations that were too high for some of the class. What was fun one week was difficult and a chore the following week. Breaks in instruction due to my absence from the classroom to attend CTPL meetings caused radical swings in ALT that were more severe than those of the previous year. Even so, math gains for this class on the posttest achievement tests were significantly greater than the gains of the previous year's class. Attitudes toward math continued to improve and were all positive by June. Cooperation among the children and with me was in much greater evidence with this group than the first class.

Although I have no concrete evidence in terms of clocked ALT for individuals or the whole class, my own observations showed that I dramatically increased the ALT for math for this class. Comments from the principals and other teachers entering the room during math instruction were complimentary, and they frequently expressed amazement at how hard everyone was working. These comments seem to indicate that high ALT is the student behavior a teacher is expected to deliver. How or why students may have extended periods of ALT should be of prime concern to teachers and administrators.

The Reading Experiment

After several weeks of school I diagnosed the reading needs and abilities of these 2d-year BTES students. I decided to experiment again with this class in an effort to raise ALT for reading. You must understand that I have a short memory and had already forgotten the trauma of the previous year with math. Reading scores were below grade level for all the sixth-grade classes. The reading program followed in my school and in most of the district schools is mandated by the district. It is a primary program that has been extended to all six grades for implementation. A reading specialist is assigned to each school to help maintain the program in all classrooms as well as to offer tutorial reading instruction to those pupils in the lowest quartile on standardized achievement tests.

Promising teaching practices reported in BTES in 1976 suggested that for fifth-grade reading, greater emphasis should be placed on comprehension than on basic decoding skills and word configuration. Sustained interaction between teacher and pupil around fewer instructional materials was suggested as another promising practice. Fifth grade reading instruction should be designed to require the use of more complex thinking processes in comprehension activities using fewer materials. Continuing to assume that it was reasonable to expect that sixth-grade reading practices were closely related to fifth grade, I began to redesign reading instruction in my classroom.

The reading program in the district was considered to be highly individualized. It consisted of a word configuration component (word recognition), phonics, comprehension, and oral reading. Each student was assigned to a basal reader appropriate to his or her reading level. Enrichment was horizontal, not vertical, with supplemental activities at stations. Station 1 was with the teacher, station 2 was the independent followup, and station 3 was an an opportunity for reinforcement through use of games. Almost all classrooms at the primary level had aides to assist the teachers. Upper grades had no additional support personnel. A wide variety of instructional materials was available and was used in the classroom in both primary and upper grades.

In an attempt to focus more instruction on reading comprehension activities, I eliminated station 3—the games and audiovisual activities. Heterogeneous ability groups were formed and met with me at the instructional center for at least 20 minutes each day. All other students remained at their own seats with independent assignments. As in math, less physical movement within the room resulted in using less time in transitions from station to station. In addition, games and audiovisual activities had been a consistent distractor for students at other stations. For upper grades, this station 3 concept was viewed by most teachers as a deterrent to reading instruction rather than a facilitator.

I discontinued the configuration component–the flash card technique for recognition of words. Time for phonics instruction using nonsense words was eliminated for all students unless it was obvious that a student had missed all the previous primary and middle grade phonics instruction and had no word attack skills.

I focused almost all reading instruction on comprehension activities. Again looking to the research as a base, I established a pattern of instruction that made it possible for me to prescribe, monitor, and interact with each student on a daily basis. I established a contract system for independent reading activities. A pattern of revolving comprehension groups evolved as I obtained instructional materials with a range of difficulty. I monitored all programs and was able to interact with the students concerning the reading concepts. In addition, the materials themselves provided immediate feedback for the students.

This instructional pattern was considerably different from the district's reading program. The students eagerly adopted the new plan; perhaps they were tired of the previous program, since it had been their sole pattern of reading instruction since the first grade. It was necessary to establish cooperative standards of behavior for the reading period, but as we openly discussed transition times and behaviors, the transition times between groups and subjects dropped to 1 to 2 minutes. Monitoring ALT on the instructional materials became much easier as the moods of the class changed. I knew the kind of ALT I was seeking. Once the children experienced the feeling of success, they also appeared eager to capture it again for themselves.

Student Cooperation Critical

This class began to talk about their need for superior classroom cooperation and behaviors that would allow each person to work to his or her fullest ability. They clearly wanted an environment that was quiet yet relaxed enough to move about to get needed materials and/or help. As the year progressed the self-direction of many of the students became more apparent, whether they were working directly with me or in their individual areas.

I established study carrels for each pair of students, using cardboard as dividers or walls. I provided bookends for each student, to house any overflow of books that would not fit into the desk. The students papered the dividers in wallpaper of their choice; some brought desk equipment from home. The environment was businesslike, yet pleasant, personal, and relaxed. Each person had a place of his or her own for study, relatively free from typical classroom distractions.

Students, Test Scores, and Feedback

I held parent-student-teacher conferences to go over the quantity and quality of the students' daily work. I included the child in the conference as an equal partner in reviewing the work. All were interested in learning how they did on the standardized achievement tests. It was the first time that many had ever really known how they had performed on such tests. I discussed the concept of ALT–without using its name–with the parents and the children. Reasons for the room environment and the group activities appeared to take on new meaning for all concerned.

My experience with ALT for both reading and math for this class was positive. Although I had no aides or assistants to help with the implementation of the program, this class had substantially increased the amount of Academic Learning Time within the allocated time for reading and math. Further, as a group, they felt good about themselves and school and looked forward to entering junior high school. Many have returned to share with me their successes during the current year.

After I had scored their annual achievement tests in late May, I again conferred with each student. I gave the students their test results and showed what gains or losses they had made.

An interesting spinoff of this activity occurred that had a direct effect on the ALT for both reading and math. Because most students were very pleased with their improvement on the tests, they said they were pleased to have learned. They also said they were tired of working so hard for so long.

It was time for a change of pace. I had a choice to make, because ALT for reading and math had become lower after the feedback than at any time during the year. Typical reinforcement activities no longer produced results. It was apparent that I could agree with them and respond to their concerns with learning activities different from the pattern we had followed throughout the year, or I could try to insist that we follow the regular routine to the end of school and take the chance that ALT would skid out the door.

ALT as a Tool

I had learned another interesting variable for maintaining ALT. Giving too much feedback on student performance on traditional posttests–CTBS in my district–causes students either to become discouraged and full of despair or to consider themselves as having achieved more than sufficient learning for the year. They graduate themselves! When this occurs, ALT plummets if the same instructional program continues. Many resisted more comprehension assignments in reading. Independent free-ranging library reading alone produced high ALT during the last 4 weeks of school. Perhaps this is not all bad. I responded with a variety of different activities. Had I chosen to assess the ALT for these activities, it would have been high. The power of ALT as a tool to measure learning, whether externally measured or not, became more and more apparent. If it is used to help evaluate and monitor academic subjects, the term ALT is probably appropriate. If, on the other hand, it is used to help evaluate activities in the affective domain it could be equally valuable under the title of Active Learning Time. I think and use the terms interchangeably.

Implications of ALT

An Unanswered Question

The response of the second class to increased ALT led me to another unsolved question that research had not yet addressed. Is it possible to increase ALT to such a level that it could be a negative influence toward school attitudes? By being perceptive to the changes and behaviors and moods of the class, I was able to see that my instructional program needed to be changed for the last month of the school year. I decided that the possibility of too much ALT was another variable that needs serious research.

ALT–An Unshackling Idea

I view ALT and the BTES as tools that suggest practices to be used by teachers in an individual manner to further the art of teaching elementary children. In no way do I view the study or findings as a prescription of what a teacher ought to be doing in a classroom. If an entire faculty could view the issues raised by the study and application of ALT, and agree to experiment within their own classrooms using their own styles, the experience would be productive for education.

The implications of ALT indicate some necessary self-evaluations that must be made by teachers. Hard questions must be honestly answered if a teacher is to experience success with ALT. Can the teacher accurately diagnose individual student needs and level of skills? Is the teacher's skill at prescribing learning activities sufficient to ensure an orderly presentation of skills or challenges to the students? Is it possible to monitor closely the students' learning on a daily basis? What kinds of changes in presentation would be necessary if the concepts were to be taught to a large rather than small group? How much time is available to interact with individual students on a daily basis? How much feedback can be supplied to the students, and how fast?

As an individual teacher responds to such questions and evaluates the program within his or her own classroom, it should become apparent whether the basic teaching skills or behaviors as suggested by BTES are present or absent. Only an individual teacher can honestly assess his or her own basic knowledge. The obvious implication of these issues would be to obtain help to develop the skills if they are lacking, use them if they are present (but not being consciously applied within the classroom), or refine them further if that is appropriate. Certainly the notion of evaluating teachers on the basis of classroom ALT observed on visitations by principals should be vigorously resisted.

Time–An Unresolved Issue

Later findings from BTES and ALT converge around the variable of allocated time and level of difficulty of materials presented to students. There is a great range in amounts of allocated time for both reading and math. Implicit in the examination of the amount of allocated time should be the amount of time the students are on task during allocated time. The issue appears to be not necessarily how allocated time can be increased. Despite the current "back to basics" movement, we must remember that increasing allocated time to increase student learning may not be the central issue. There may be a maximum amount of allocated time desirable for a class. To go beyond this limit may be a negative indicator rather than a positive one for ALT. Too many variables interfere with a finite statement of time allocation. BTES does not speak to this issue.

Student Success–An Unresolved Issue

The proper level of difficulty of materials, with the resulting degree of success the students experience remains an open-ended issue. Of all the variables within the study, this was the most difficult for me to manage over an extended period of time. The research was conducted on the second- and fifth-grade levels, but I attempted to extrapolate findings for students at the sixth grade. Although I was unable to replicate the BTES findings within my class, the implication that appears to be powerful is that a greater amount of practice is appropriate for all students. How much practice and at what level of difficulty still must be determined by the individual classroom teacher working with the unique group called a class. Related to this issue is the question of the appropriateness of using textbooks as the major structuring statement of the curriculum. Many books may not be supplying adequate amounts of practice materials to ensure consolidated learning by students.

The study indicates that ALT may be a tool to help teachers observe concurrent learning rather than relying solely on standardized tests whose results are no longer relevant. The power of this implication is obvious to any teacher. The opportunity for immediate feedback and manipulation of variables by the teacher to meet daily challenges to obtain high ALT stimulates classroom teachers to develop and use all of their professional skills and sensitivities. While the study was limited to the academic skills of reading and math, my observations within my own classroom indicate that the usefulness of ALT is not limited. It could supply information on student engagement in affective as well as cognitive tasks. Perhaps, in fact, this may be the only kind of measurable learning that can be observed in many self-directed affective learnings. Seldom do the standardized tests given in public schools tap such learnings.

BTES Makes Common Sense

Another implication of the BTES research is its support of the commonsense and almost intuitive teacher behaviors and environmental variables which comprise the art of teaching. With each increasing bit of knowledge about learning, classroom teachers have a rationale for defending good current practices and rejecting suggested programs or materials not based on research. Teachers should consider their style and individual approach to maintaining or increasing ALT as a basic teacher academic freedom. I leave to the teacher-educators the implications for staff development in the basic teacher skills involved in developing ALT, and the development of skills for preservice teachers. The implications for strong development of sensitivities to the behaviors and silent language of students as well as a strong base of cognitive content are apparent; but, in addition, teachers need a wide repertoire of intervention and reinforcement techniques to move toward greater amounts of ALT.

In addition, if classroom teachers had been evaluating new programs on the basis of their personal experiences with ALT, perhaps some of the presently used programs and materials might not have been adopted. The teacher behavior variables within the study such as diagnosis, prescription, presentation, and feedback, as well as allocated time and range of level of difficulty, are fine criteria for evaluating suggested new programs.

Our Classrooms

Finally, the most general and yet most powerful implication for the issue of ALT is for teachers to be able to take back control of their own classrooms in an independent, thoughtful, and responsible manner. Using the rationale and application of research findings, self-study, and self-improvement of skills, teachers will be able to resist fads, practices, and programs that seem to run in cycles, often counter to commonsense and intuitive teaching experiments, and use instead concepts presented in research such as BTES. Teachers do need help in learning about such research, and about the findings.

I would hope that teachers would not wait to be "facilitated" into trying out the issues raised in BTES. I would further hope that administrators and central office personnel would refrain from checking ALT in classrooms with an idea of evaluation.

Descriptive, Not Prescriptive

ALT is a powerful tool, not a prescription for how and when to use the tool. ALT as a concept is dynamic and ever-changing in each classroom because it focuses on ever-changing and growing human beings. A teacher must make constant adjustments in practices within the year as well as from year to year. Teachers do make a difference through their sensitivities and perceptions of their students, as well as with their academic knowledge. Only a teacher, a growing human being, can use tools such as ALT and utilize the skills mentioned in the study to synthesize a program and environment that are flexible, personalized, and appropriate for both teacher and students.

In closing, I suggest that teachers "play" with the issues and concepts presented in BTES. Experiment with the ideas and the variables that appear relevant for your grade level and classroom. Primary and upper elementary classrooms are very different. Measure your ALT and transition time. Challenge yourself to increase ALT and decrease transition time regardless of your basic educational philosophy. Interesting changes may occur for you.

12

A Principal Implements BTES

Pamala Noli

> There are two kinds of fools: Those who say, "This is new and therefore better" and those who say, "This is old and therefore good."
> –*William Ralph Inge*

From the beginning of my involvement with the Beginning Teacher Evaluation Study, I was attracted to the model hypothesized because it reflected some old but, I thought, valid notions about teaching and learning. They were being viewed, however, in a new and exciting context.

I had been appointed to the research advisory board as a representative of mathematics educators working at the district level. Eighteen months later my job changed from curriculum consultant and ECE coordinator to principal of two K-8 schools in a rural community. BTES seemed the perfect vehicle by which to reach three of my major goals: to improve student achievement, to set up a staff development program that fit the value system of the faculties, and to satisfy the district's need for higher test scores.

During the summer between my appointment as a principal and the fall when I assumed the position, I set about conceptualizing a staff development plan. I was plagued with a number of doubts and fears. Would these two staffs like and respect me if I pushed too hard too fast? How would I deal with teachers who rejected any attempts at change? Wouldn't it be better to wait a year until I had (hopefully) established my credibility? Would I alienate the other principals if I was too "gung ho" and was able to raise test scores to a noticeable degree? Could I cope with all the new managerial tasks before me and do this too? Could this effort hurt the school climate I hoped to improve? Did I have the necessary leadership skills? When I realized that these doubts were getting the upper hand, I tried to reason with myself on the other side. Hadn't I successfully taught at a number of grade levels for 6 years and continued to teach in classrooms regularly in every job I had held since? Hadn't I had lots of leadership roles at the school and district levels over the past 8 years? Hadn't I spoken all over the State since 1970 on such topics as individualized instruction, mathematics education improvement, and humanistic competencies, and acted as a consultant to a number of other school districts? This last question brought my fears into clear focus. Except for my experiences as a classroom teacher, resource teacher, and curriculum writer, much of what I had done in my career had been of the "blow in, blow off, and blow out" nature. Now I would have to live with the results.

I remembered something Eleanor Roosevelt said: "I believe that anyone can conquer fear by doing the things he fears to do, provided he keeps doing them until he gets a record of successful experiences behind him." Clearly, I had to begin lest I never do so. I dismissed the warnings for caution offered by the researchers on the advisory board who repeatedly pointed out that the BTES hypothesis had not yet been empirically validated, and I plunged ahead.

The Question

By the end of the first part of the study, a hypothesis had been generated that students who accumulate more Academic Learning Time (ALT) in a particular achievement area will attain higher achievement scores in that area. The model formulated from this hypothesis stated that teaching processes, such as diagnosis, prescription, feedback, structuring, and monitoring, would have a direct influence on ALT. The question that I addressed was simply how to introduce the staff to this concept so that they, in turn, would work to increase the students' ALT in reading and mathematics in our elementary schools. Time itself was not seen as the end in the BTES research, but rather as a means to the end. As one increases ALT one can, as a result, cover more content. If more content is not covered, increasing time will have little effect on achievement. With this in mind, in all activities that took place, I linked time with content coverage.

Fall 1976

The first series of inservice activities was aimed at "unfreezing" (Lewin, 1951). I prepared myself by reading all the available materials to which I had access, including works by Berliner (1976-1978), Rosenshine (1971, 1976, 1978), and MacDonald (1976).

Knowing that teachers are not too receptive to new ideas when they are presented at 3:30 in the afternoon, I went to the board early in September to ask for a weekly reduced day for staff development. The teachers agreed to add 15 minutes of instructional time each morning (school was to start at 8:30 rather than 8:45), and students would be dismissed 1 hour and 15 minutes early on Mondays. Allocated instructional time was not reduced.

I summarized the major ideas of the BTES research and shared them with the staff once a week, 15 minutes per staff meeting. I continued this practice throughout the semester, with discussions centering on theoretical and philosophical implications. We clarified our own values and notions about how children learn and why we do what we do in the classroom. When it was clear that the central construct of the BTES hypothesis was in harmony with the beliefs of the staff, we moved to our second phase.

Spring 1977

Consciousness-raising discussions continued, but the focus shifted from the general to the specific. Every week I observed in at least six classrooms. My purpose was to gather observational data on randomly selected students during reading or mathematics instruction. I explained the methodology to the staff beforehand so that everyone understood the procedures that would be employed and how the data collected would be used. With two stopwatches, I timed the amount of on-task behavior exhibited by one student over a 10-minute time duration. One stopwatch ran continuously. The other was on when the child was engaged in active learning and off when s/he became disengaged (daydreaming, sharpening pencil, talking to a friend, changing groups, and so on). Immediately after the observation I calculated the percent of time the student was on task and described in writing the environment and sequence of events encompassed in the time period.

At the end of the teaching day, I had a conference with the individual teacher to share with him or her the information that had been gathered and the specifics of what had transpired with the observed child. It soon became clear that some teachers were much more open to this activity than others, and some were downright threatened. I decided, for the present, to limit my classroom observations to those teachers who were receptive.

During regular staff meetings, I shared my summaries of that week's observational data, being careful not to name specific teachers or children. A predictable reaction on the part of the staff began to emerge. They were quite aware, by this time, that the ALT notion was important to me. Because I was their immediate supervisor, new to the staff, and the person who wrote their evaluations, a certain amount of anxiety set in. Although no open hostility was shown, I occasionally overheard comments like these: "How was your ALT today?" (teacher to teacher); "Our next outside consultant is sure to be John Alt" (teacher to teachers); and "If your ALT is off when Mrs. Noli comes in, you guys have had it" (teacher to class). One teacher told me, much later, that they were all very apprehensive and insecure because an unknown "hotshot" from the district office was their new principal.

Sensing their fears and recognizing that some of my own were about to materialize, I decided to downplay the whole effort and work only with the teachers who expressed interest in continuing. I hoped that after the teachers had received their first written evaluations from me and had had the recuperative time out provided by the summer, our trust level would be such that we could proceed again. My only reference to BTES during the last quarter of school was to share with them what happened at BTES advisory board meetings, in the context that they had a right to know what I was about when I ran off to those 2-day affairs. I hoped that my enthusiasm for what was happening would be contagious without posing a threat.

Fall 1977

As anticipated, the staff returned eager to begin the new year. I openly discussed my fears of the previous spring (I was obviously more secure now) and asked them if they wanted to continue to develop the BTES constructs. Consensus was reached in the affirmative, with the agreement that ALT data collection would occur only in the classrooms of teachers who volunteered. Four out of nine did so. Staff meetings that followed included 5-minute brainstorming sessions wherein ideas were generated relative to one particular facet of the time model, such as decreasing transition times, improving monitoring techniques, using aides and parent volunteers to increase ALT, helping students learn to cope with the state of being "stuck," and using multiple-response techniques. The brainstorming was followed by small grade level cluster discussion groups to identify and elaborate on the ideas which seemed useful to each specific classroom. Much discussion focused on the problems of individualized instruction and learning center activities in light of this new framework.

Spring 1978

By February, many excellent ideas had surfaced and some were being implemented. I again began to gather observational data on students as I had the year before. The anxiety level of the teachers further decreased because they had all received two evaluations from me and were secure in the knowledge that they were not going to be judged on paper relative to what they were doing with ALT. Some jokes continued, but most were good-natured teasing about whether or not they would survive my doctoral program if I chose to pursue ALT as a dissertation focus. One more teacher volunteered for classroom data collection.

In late February, an experimental intervention study was published which Berliner (1978) and members of his research team had designed and carried out. Although all three researchers were excellent educational psychologists and research methodologists, their elementary school experience was limited to their classroom observations.

Each week during inservice meetings, I shared with the staff parts of the four interventions which had been carried out to improve ALT. Together we analyzed and critiqued each case study for better strategies that could have been employed in that environment. By this time, the teachers felt that they had a good deal of expertise in the area and were satisfied that they could have done a better intervention than had the "professionals" with a national reputation. At the same time, I was sharing with five of them their own ALT observational data which demonstrated considerable improvement over the previous year. We also shared this improvement with the rest of the staff. Feelings were much more positive.

Fall 1978

Although the final phase of the research had been completed the previous spring, I had decided to withhold the results until the fall when the teachers would return renewed, refreshed, and responsive. At an early staff meeting I summarized the final results. Some expressed relief that the theory we had pursued for 2 years had been empirically validated, and I certainly concurred. Others said that to them the final report was immaterial. They *knew* from their own experience that increased ALT made a difference in student achievement and that if the research hadn't confirmed it, the fault was in the methodology. As proof, they offered the previous spring's standardized achievement test scores, which were the highest ever achieved by the school's students. I cautioned them not to jump to such conclusions based on test results, since we hadn't controlled for other variables (the methodologists on the research advisory board had, by this time, educated me about the complexity and inadequacy of most social research design), but I was secretly pleased that they perceived a correlation.

One of the findings that we had not anticipated was that high success rate, rather than medium success rate, would enhance achievement. Our working definition of ALT had been the amount of time students were engaged with materials of intermediate difficulty. Debate ensued over this point because much emphasis had been placed on individual diagnosis and prescription which resulted in teaching children at a level where errors were to be expected. Were we now to assume that all materials were to be at such a low level that every child would get 100 percent at every turn? We reached the conclusions that the direct instruction level must be one step beyond the point of previous mastery and that errors at this level were to be expected; that teaching should continue on the objective until low error rate was predictable; and that practice with the learning, when it became easy, was important for evaluation, reinforcement, and transference. We felt that the practice could best be done through homework, thus not retarding the content coverage potential.

I offer the above discussion only as an example of the type of dialogue that can occur, not as the correct interpretation of the implication of the high success rate finding. We have reached our conclusion, however, and action on the part of teachers is occurring, particularly in the areas of homework and parent education.

In retrospect, I can see that my original fears were exaggerated but nonetheless useful. They made me more aware of my actions and sensitive to the concerns of the others with whom I worked.

The respect and liking had to be earned over time, but would never have been achieved had I abdicated to maintaining the status quo. "Handling" teachers who resisted change was difficult until I realized that we all learn, change, and grow at different rates and in various ways. No amount of pushing, power, or "handling" will make a difference until teachers have to work individually, within their own value systems.

My fear about the other principals was warranted, but for other reasons. They were concerned that I would receive more favors from the district office because of my previous 6 years there. It took almost 2 years for those anxieties to diffuse so that I could become an accepted colleague. They did not even notice the test score shift.

I found that with the help of a super-secretary I was able to cope with the building-type management responsibilities and still have time for the more important functions of the principalship, including staff development and process evaluation. Time management continues to be the key.

Some Specific Changes That Occurred

The previous sections of this paper review our chronological involvement. I would now like to move to some specific findings of the study and share an outline of what we did with regard to each. With the exception of schoolwide organizational changes, each teacher had the option of accepting or rejecting the implementation activities. No single teacher adopted all of what follows, but neither did any one teacher reject it totally. It is important to keep in mind that all actions came from the staff. My role was, and continues to be, that of facilitator.

1. Students who have longer periods of time available for instruction in a particular content area also learn more in those content areas.[1]
   - a. The day was extended by 15 minutes.
   - b. Two morning 10-minute recesses were combined into one 20-minute recess, thus reducing transition times.
   - c. Primary teachers initiated extended day schedules for small groups of children. Since room was available on the 3:30 bus, transportation was no problem.
   - d. A project was written and accepted to employ after-school and home tutors utilizing funds from CETA.[2]
   - e. Transition times getting in from recess and lunch were reduced. Movements from group to group or station to station were streamlined.
2. Students who attend to their instructional tasks more often learn more than students who attend to their instructional tasks relatively little.
   - a. Classroom disruptions have been cut to a minimum.
     - (1) Public address announcements are limited to the first or last 10 minutes of the day.
     - (2) Custodians, resource personnel, secretaries, or the principal enter rooms only at normal transition times unless there is an emergency.
     - (3) Students leaving class for music, speech, and so on must keep their own schedule and leave quietly. Exit and reentry times are scheduled, as often as possible, to occur at natural transition times.
     - (4) Early in the year, simulations and role-playing activities are carried out so that children will not be drawn off task by a classroom disruption. As an example, two children simulate an argument. The class is told that it is okay to check out what is happening (they would regardless), but they are expected to get back to work immediately, even though the argument may continue. The scene is played out and the children practice the desired behaviors.
   - b. On-task behavior is rewarded in various ways.
   - c. A sustained silent reading program is carried on every day from 12:40 to 1:00. Everyone in the school (students,

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[1] All seven of these statements were taken from the draft BTES Technical Report (see Bibliography).

[2] Comprehensive Employment Training Act.

teachers, aides, secretaries, custodians, and parents) reads something of their choice in the classrooms. The phone is off the hook, the office is locked, and a sign informs visitors that they will be helped at 1:00, but in the meantime they are to take a book from the stack outside the office door and read.

3. Students learn more when their teachers are skilled at recognizing the specific strengths and weaknesses of individual students and assign tasks that are appropriate to the needs and levels of readiness of individual students.
    a. Inservice education was provided on diagnosis and prescription.
    b. Learning modalities will be explored this year.
4. Student engagement rates are higher when students are involved in more academic interaction with the instructor. Engagement rates are higher in a group setting than during independent seatwork. Engagement rates in the seatwork are higher when students receive more monitoring or help from an instructor.
    a. Paid classroom aides are trained and used as instructors. Their 3-1/2 hours per day are spent totally in this role under the direction of the teacher. Clerical tasks, including recordkeeping, paper corrections, and the like, are done by two 8-hour aides who spend their afternoons so engaged.
    b. Parent volunteers and cross-age tutors work predominantly as monitors, helping the students assigned to independent seatwork or centers.
    c. Multiple-response techniques are utilized regularly when working with groups, especially at the recall level. One staff development afternoon was spent making individual 12" x 12" chalk boards for each child. Students bring fuzzy socks which serve as their erasers. When the teacher asks a question, every child responds on his chalk board. The result is a much higher engagement rate since every student participates every time. The teacher is better able to diagnose the group's learning and pace the lesson accordingly.
    d. "Independent" learning centers are monitored by cross-age tutors or parents unless the station has an audiovisual focus of interest such as a tape or filmstrip.
    e. Individualized self-paced instruction is done only with small, monitored groups. Self-directed kits and programs such as SRA, SWIRL, IPI, or Barnell-Loft are never used with the whole class, because monitoring and immediate feedback have been found to be extremely difficult when the adult/student ratio drops below 1:10.

5. Student engagement rates are higher in classes where there is a clear focus on academic achievement as an important goal of schooling.
    a. An academic "down-to-business" atmosphere sets the tone in most classrooms during reading, mathematics, and language instruction. This does not preclude student cooperative projects in centers, for instance, nor does it mean that motivation and excitement are stifled. Academic achievement is expected, and students are held accountable.
    b. Teachers structure activities so that students understand what is to be learned during a given period and what behavior is expected.
    c. Afternoon periods following the silent reading period vary in their forms but include activity-oriented subjects such as social science, health, science, and physical education; creative activities such as art, music, and drama; and affective activities such as magic circle, centering, and values clarification.
6. Students learn more when they receive more frequent feedback about whether their responses on academic tasks are right or wrong.
    a. Multiple-response activities allow teachers to give feedback to a number of students on each question.
    b. Small groups with a monitor are receiving much more individual feedback than is possible with other grouping arrangements.
    c. Self-correction of independent seatwork is encouraged, but papers are spot-checked by an adult so that the teacher can respond with direct instruction to any child who is experiencing difficulties.
7. Students learn more when the classroom learning environment emphasizes cooperation and student responsibility for academic tasks.
    a. Strategies to promote cooperation and responsibility will be one of our focuses in staff development this year. Although we have not discussed this as a group, I have observed many unique approaches in the classrooms and feel confident that a little brainstorming and a lot of sharing will help to foster this goal.

Concluding Thoughts

I have referred to the ideas generated by BTES as a framework, and it is as a framework that BTES has greatest potential for staff development. If this framework fits securely and comfortably on the foundation of beliefs, values, and general philosophy held by the staff, work can begin on the superstructure. As the building takes form, its uniqueness will reflect the visions and character of its builders, the teachers. Unlike other edifices, however, this one will never be finished.

13

Dissemination: The Jargon and the Reality

Ann Lieberman

Dissemination, generally thought of as the process of spreading information, turns out to be as complicated as the many institutions that are involved. To get ideas to take root in different kinds of soil requires a knowledge of specific and unique problems inherent in the growth process.[1]

This chapter explores some of these problems as issues in the dissemination process. These issues include: the problem of isolation among the educational constituencies, the eternal search for easy answers to complicated questions, expectations from research, language as a barrier among groups, materials, personalization of knowledge, the tension among "loosely coupled groups," and the linker and the linkage process.

The Jargon

Current in our educational vocabulary is the word "dissemination." We now have dissemination projects and pressure to disseminate research findings, and most funding agencies call for some form of dissemination. The assumption is that one can take information and spread it among the populace. The very term assumes a lack of connection between the information to be spread and the people who would be the receivers. There are still many who assume that one can take a body of ideas, however well put, and infuse them into an organization.

Such a simplistic view of schooling has been refuted by a growing set of studies revealing that we are only beginning to get a sense of how the

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[1] The issues raised in this chapter use the Beginning Teacher Evaluation Study (BTES) as a referent, but the intent is to raise a series of issues on the general topic of dissemination. The author was project coordinator for 1 year of a statewide effort to disseminate BTES results.

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school works as a social organization (Jackson, 1978; Lortie, 1975) and how complicated school improvement is from both an individual and an organizational perspective (Berman, 1975; Goodlad, 1975; House, 1974; Sarason, 1971). It is important for us to exchange our zeal for instant reform of an already beleaguered institution (Lieberman, 1978) to a more informed understanding of how ideas *actually* get into schools, how they are perceived by various people, and how social and political conditions affect the interaction between the two (Farrar, et al., 1978; McLaughlin and Marsh, 1978).

Isolation of All Groups

It has become almost a commonplace that teachers in their classrooms are isolated from one another and, therefore, are not very trusting of one another or of people outside their own immediate workplace. What is mentioned less often is the isolation from one another (and among themselves) of *all* the constituent groups who have a stake in educating children. Teachers rarely, if ever, talk about educational issues with each other. Principals and teachers, as well as researchers and developers (Ward and Tickunoff, 1975), each talk to their own groups but rarely to the group to which they need to relate—both for better communication and because the work of these various groups is interconnected. What we have, then, are many separate groups all clamoring for better schools and improved practices, and a notorious lack of mechanisms to connect these groups to one another.

Different expectations from and different perspectives on the educational enterprise are to be expected. But without all the groups attempting to understand these differences, we have everyone placing blame on some ubiquitous enemy. (The enemy changes depending on the group.)

> *Example* (District Personnel)
>
> In one large district, I was asked to give exactly the same speech to three separate groups. When I asked why we could not put them all together, I was told that each group is comfortable with their own kind and would not raise questions if the groups were mixed.
>
> *Example* (Parents)
>
> When I spoke to parents, they wanted research to be able to prescribe for the teacher exactly what he/she should do. When I explained that research helps us better understand the complexity of teaching, they were frustrated at its incompleteness.
>
> *Example* (Teacher-Educators)
>
> Teacher-educators—many of whom have seen shifts in the profession over the years, from developmental concerns to the importance of the disciplines to the three R's—are skeptical of research, and rightly so. In

one large teacher education faculty, the older faculty members revealed their cynicism with the openness of the younger faculty, still struggling and open for discussion. The research being reported was the vehicle for discussion, but it was clear that such discussions among the faculty were few and far between. One might speculate that this meeting is not atypical of other departments of education.

The Search for Panaceas

BTES makes some interesting observations about students' use of time in a classroom, teaching functions, classroom management, and school-related learning. The research raises some significant issues about the worklife of teachers. The researchers know there are many things they did not look at. There were choices to be made. Those who are told about the research hope that answers to those hard questions about what teachers do and what happens to students will finally be revealed. The search for simple answers to complex questions seems continuous.

Researchers working for a long time refining, thinking, and struggling over their data care very much about clarity, definitions, and concepts that can be operationally defined. They know that they cannot describe the universe.

Teachers, on the other hand, live daily in the maze that researchers are attempting to describe. They may intuit much of what the researchers conceptualize and categorize. When the categories of the researchers match the intuitions of the teachers, we begin to get a language and a connection between concept and practice.

What remains problematic is that research is often elevated to a position of such loftiness as to be untouchable—or at the other end disregarded as "too theoretical." Neither stance allows for the hard work necessary in understanding teaching and learning. Nor does it allow for grappling with a way of talking about ideas that respects the difficulty of good, clear description on the part of the researcher *and* the myriad number of complexities within which a teacher operates. No matter how much we wish otherwise, complex phenomena will remain complex.

Long-Term Research—A Special Problem

BTES, among other studies, is considered long-term research. In this instance, the research went on for 6 years. Such a long passage of time in itself raises several issues.

Because so much time is spent "doing research," we expect that the findings will somehow be bigger and better. Again, the hidden life of a researcher needs to be revealed to the lay public. We need to know that more time spent on research often means more time to try various methodologies, more time to check out hunches, perhaps more time to look more deeply into a given area. It may mean time to think about concepts or time to translate what it all means. It may mean time to write up observations, code them, feed them back, check perceptions.

Still another issue specific to long-term research is the problem of research done in one era and delivered in another. This is not an uncommon problem. In the case of BTES, the delivery of the findings comes at a time when the pendulum has shifted to a "back to basics" mood in the country. No matter how much one states that the BTES framework is only *one* model among several existing ones in a teacher's repertoire, it is being used by some as *the* model, the one and only model.

Researchers have often taken the stance that those who read their results will take out what they want and disregard all the caveats. This absolves them from considering the political context within which the research is delivered. Educational research, like research on atomic energy, gets used, abused, perhaps distorted. Does the researcher have no responsibility as to the context within which ideas get placed? Perhaps we need a "Committee of Concerned Educators" who will consider and raise issues about the *value* and *use* of research within the social and political arena.

Relationships between the studier (the researcher) and the studied (in this case, the teachers) affect both groups and, in the best of circumstances, change both groups. But these learnings are personal unless they become part of the dialog included in the dissemination effort. Such dialog, especially in a long-term project, can be provided for. It may be the most important learning for all concerned.

Dissemination–The Problem of Language

Moving from researchers to district office to classroom, one cannot help but notice the very significant differences in the use of language. It is not just that each group of people has its jargon and shortcuts to complexity but that the same words have very different significance for different groups.

> *Example* (Model)
>
> The word "model" for researchers means that they have put together various concepts to form what appears to be a logical set of interrelated phenomena. BTES is an example.
>
> The word "model" to the field means that we now have an explicit set of ideas that describe what the teacher and learner should do. This may lead, as it did in several instances, to a district asking all teachers, by memo, to increase "student time on task."
>
> One might respond that the administrators of this district just do not understand. But it is more complicated than that. A field that is as uncertain as teaching is constantly searching for certainty, and a model speaks to that search. It appears as an organized, interrelated, logical set of dimensions ready for use.

> The field can learn that models do not necessarily represent all dimensions of a given phenomenon, and researchers can learn that there are words that are often less definitive and more communicative. The difference between a model and a set of ideas is substantial. If research on teaching and learning is to be understood and ultimately to be of use to teachers, disseminators must be sensitive to language and meaning both within and between groups.

Materials

Recent information on school improvement projects reveals that materials play an important role in helping people open up to new ways of thinking (Emrick and Peterson, 1978). Moving from technical reports to written materials that don't oversimplify the research becomes the central problem. Creating attractive materials need not mean that one is writing for people who do not read. On the contrary, technical reports have a very small and restricted audience.

Materials on several levels can be created. For example, one may have newsletters that excite interest in a project, or issues papers, or critiques. Much of this information can be aimed at stimulating dialog. If research consists of asking important questions and gathering evidence to answer them, why can't we also have materials taking the same inquisitive stance? There will always be the tension between under- and overstatement of research findings, but that tension is critical if we are to continue to research practical problems in education.

Dissemination of Research—A Personal View

Often dissemination of research and/or curricular innovations has been carried on by materials alone. Over and over again I was told how important it was to participate in a dialog where ideas could be heard, questions could be asked, doubts raised. Teachers, administrators, teacher educators, and parents lack a forum for the discussion of educational ideas, a forum where one can participate in a supportive atmosphere without being graded as in a class, evaluated as part of one's job, or mandated to perform. If we are to treat adults as learners (as we would have them treat children), we need to think about creating ongoing networks of people who can come together to work collectively at understanding research, practice, policy, new laws—all approached in ways that relate personally as well as professionally (Reynolds, 1979).

Educational Constituencies as Loosely Coupled Groups

Weick's (1976) metaphor of educational organizations as loosely coupled systems expresses well the problem of dissemination. It is assumed that everyone in the educational enterprise cares primarily that children learn and enjoy school and that any or all ideas that help accomplish this end are to be used to improve schools. All would agree on the large goal, yet there are different means to achieve improvement, different vested interests, different stakes, different roles to play and, clearly, different expectations of research, programs, and innovations. In disseminating the major issues of the Beginning Teacher Evaluation Study, these differences become salient.

> *Example*[2] (Teachers)
>
> These issues are very interesting and important.
> They make me feel like what I am doing as a teacher really matters.
> What do I do with this description?
> Yes, I know when the kids are engaged they are learning more.
> How do I keep engagement high when I want it?
>
> (Principals)
>
> This is really good stuff!
> Do you have any more material?
> I need to understand it better.
> *My* faculty is really ready for this.
> Do you see BTES as a source for staff development?
>
> (District Staff)
>
> We have been looking for a theme. This may do it.
> Could you come and speak to our board members?
>
> (Parents)
>
> Does this research now give us a tool for the evaluation of teachers?
> Are you saying that we now know how to teach reading and math effectively?
> Does academic learning time differentiate good teachers from bad?
>
> (Teacher-Educators)
>
> This is only a correlational study.
> I am using this information in my methods class.
> I don't like nor agree with the assumptions underlying this study.
> How did they measure *engagement*?
> At last, some empirical evidence!
> Will there be policy emanating from this study?

Dissemination efforts must consider the subtle yet significant differences between and among these groups. The teachers can get information and support for their intuitions as they search for concrete ideas to aid them in the classroom, as Raquel Muir described earlier. Some principals, as was evident in the chapter by Pamala Noli, look for a set of ideas that can serve as an ongoing source for staff development. Using an outside resource person, or materials, as a stimulus can be a source for teacher self-evaluation. District people are often concerned with how to organize a thrust or a theme around which to hold meetings. Mechanisms to get people to work on various projects are often a prime concern. Parents want their children to do well in school. Their interest is in how to get the teacher and/or the school to provide quality education. They, like teachers, are also interested in the concrete and the tangible. The chapter written by Karen Kepler speaks to the fact that teacher educators care very much about the assumptions underlying research and how it is being interpreted. For some, evidence is critical; for others, as Carolyn Denham discusses in the next chapter, there is a growing concern that policy statements will be inferred from research findings.

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[2] These examples are drawn from a sampling of responses from hundreds of people.

The tension between these groups is based on their different roles and commitments to the educational enterprise and explains the loose yet important connections between them.

The Linker: A Model?—A Process?

Central to any dissemination effort is the role of a linker: a person who moves between groups, connecting them where possible, and sensitive to their different and varied modes of thinking and understanding. Who these people are, how they come to learn their skills, and what they need to know has been written about elsewhere (Crandall, 1977; Lieberman, 1977, 1979). What concerns us here is the central concept of modeling; that is, acting upon the kind of behavior that linkage suggests: participation in the process of two-way dialog; sensitivity to the group and their expectations; involvement with groups at *their* level of understanding; use of many ways to engage people in asking questions, giving information, becoming involved. Dissemination of any kind of information involves a linker in teaching and, therefore, provides a unique opportunity to model these behaviors.

Dissemination as Linkage

An effective dissemination effort, then, if it is to be more than just a cursory listening to a 15-minute speech or a fast reading of an article or, as the dictionary states, "a scattering of seeds," involves people in a complex array of knowledge and understandings about:

1. Research, projects, concepts, or whatever it is that is to be disseminated.
2. How to talk about the subject to a variety of audiences, being sensitive to their orientation and commitments.

3. The educational field's search for panaceas.
4. The exaggerated expectations from a long-term project.
5. The problem of language as used by different groups that often obfuscates rather than illuminates meaning.
6. The importance of materials, written on several levels, that invite dialog.
7. The significance of personalizing information and identifying with the particulars of an audience.
8. The political implications of research to different groups.
9. Modeling the type of interactive behavior that characterizes teaching and learning.

Dissemination, rather than the simple notion of spreading information, is a complicated process that calls for understanding and acting on personal, organizational, and political knowledge (Schiffer, 1978) and an interaction of many persons and organizations. It is not just spreading seeds but helping them take root. The process is connected to our growing understanding of how ideas get into a system, how they are nurtured, and how they grow.

14

Lessons for Policymakers

Carolyn H. Denham

A major contribution of the Beginning Teacher Evaluation Study is the notion of measuring learning as it occurs, without waiting for achievement tests. The finding that Academic Learning Time correlates with achievement test scores is of interest not only because it reminds us that time is important in learning, but because it gives us hope that we may soon have a measure of ongoing learning available for everyday use by teachers in the classroom. In the meantime, the study gives teachers support for using their own observations in assessing their students' progress rather than relying exclusively on test results.

The notion of measuring learning as a process rather than a product is an attractive one. As in criterion-referenced testing and mastery learning, students are not compared on the amount of material learned. ALT, however, is an even more powerful equalizer: students begin as equals at the start of each learning period and, at the end of the period, they are differentiated only on the amount of *time* they have spent learning. In criterion-referenced testing and mastery learning, there remains the possibility of comparing students on the number of tasks mastered and the speed of mastery. Measurements of ALT do not provide the opportunity for such comparisons. Furthermore, measures of ALT do not discourage the teacher from proceeding with the introduction of the next task to faster learners while slower ones remain on unfinished tasks. In mastery learning, with its emphasis on mastery for almost everyone, some teachers are tempted to keep faster students occupied with less important activities while slower students complete tasks already mastered by faster ones.

It would be premature and perhaps inappropriate to suggest that ALT could replace achievement testing in certain situations. Yet there are signs

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The author served as chairman of the research committee of the California Commission on Teacher Preparation and Licensing during much of its work on BTES.

Charles Fisher and Gary Fenstermacher provided helpful comments on an earlier version of this paper.

that teachers as well as students may benefit by the notion of Academic Learning Time. Teachers have reported to my colleagues that they felt less threatened when held accountable for either ALT or engaged time than when held accountable for test scores or mastery levels. Further, teachers have reported to me their satisfaction at receiving immediate feedback on their efforts through attention to either ALT or engaged time.

Another important contribution of BTES is its careful definition of ALT, which specifies that learning includes more than engagement on a task–the student success level and academic content of the task must be appropriate. As a result, increasing ALT is not simply a matter of keeping students busy. Indeed, the ALT definition illuminates the complexity of teaching and the need for a variety of approaches.

It is often said that teaching is an art. Whether the teacher must be an artist or just a very good manager is unclear. But the BTES findings imply that there is a large role for the creativity and judgment of the teacher. They demonstrate the need for attention to the sometimes conflicting demands of student *success* and student *engagement*, and the potential conflict between student *success* and *relevance* of academic material. At present there is no substitute for teacher judgment in determining how best to address these potentially conflicting variables.

Attempts to maximize both student engagement and student success are complicated by the BTES finding that activities tending to increase engagement, such as whole-class instruction, may not be the best way to provide students with tasks of appropriate difficulty. On the other hand, individualized programs, with their emphasis on appropriateness of instructional content and pacing, may maximize success rate but lead to lower engagement rates (Fisher et al., 1978, 41-42).

Similarly, attempts to maintain high student success rates must be tempered by attention to the relevance of the academic material. Once a student has had sufficient successful practice on a task, new material must be introduced to keep the academic materials "relevant." The introduction of new material may lower the student's rate of success or, at least, the teacher may have to take extra measures to keep students at a high success rate while introducing new material. Unfortunately, the tension between success rate and relevance is not emphasized in reports of the study, with the resulting danger that some may interpret BTES as supporting the use of drills and other exercises, regardless of content coverage. Before Academic Learning Time can serve as an adequate surrogate for achievement, much work must be done to determine how much time should be spent at high success rates and how quickly new material should be introduced. In the meantime, the BTES provides much for the policymaker to consider: (1) the importance of allocated time, engaged time, and success rate; (2) the checklist of necessary teaching functions such as diagnosis and presentation; and (3) the impact of classroom situations such as large versus small-group instruction and emphasis on affect versus emphasis on academic work.

Using the Study for Policy

The BTES was conducted for the purpose of shaping educational policy. The above discussion suggests that students and teachers may benefit from the notion of Academic Learning Time. But what about policymakers? Specifically, the educational policymakers considered here are school administrators, school board members, legislators, members of Federal, State, and local offices or departments of education, and, finally, the members of the California Commission for Teacher Preparation and Licensing, the agency serving as prime contractor for the study.

The Problem With Mandates

First it must be understood that the Beginning Teacher Evaluation Study is not a study of teacher evaluation. The mystery of its title may be explained by an examination of the history of the project (see the discussion by Powell in the introductory section of this book). The list of teaching functions and the measures of Academic Learning Time may be helpful for working *with* teachers for improvement, but assessment of a teacher on these functions or on ALT for such purposes as rewards, tenure, or credentialing is not appropriate at this time. The reasons for this should become clear as we examine the larger question: if teacher behaviors are related to ALT, which in turn is related to achievement, can educational policymakers increase student achievement by simply requiring teachers to behave in certain ways or by requiring increases in allocated time, engaged time, or Academic Learning Time?

My answer is that policymakers cannot expect to raise students' achievement through such mandates. First, the BTES findings cannot assure policymakers that the changes in teacher behaviors or student learning time examined by the BTES actually bring about improved achievement. The BTES shares with other studies in the social sciences a tendency to produce results that are tentative and incomplete. Cohen and Weiss (1977) go so far as to argue that improved research does not lead to greater consensus but to more complex and diverse results and to technical arguments among researchers. Kepler, in an earlier chapter, indicates some of the questions that may be raised about BTES results.

Second, the principles resulting from the BTES may not be applicable to students or situations unlike those examined by the BTES; namely, reading and math instruction of second and fifth graders who are neither very high nor very low achievers.

Third, although the study reports positive relationships between achievement and both allocated and engaged time, Rosenshine, in his chapter on school time, examines some of the difficulties in increasing learning time. One way to increase allocated time for academics would be to decrease time for "nonacademic" subjects such as art, music, and physical education. But Rosenshine points out that many educators would find this option unsatisfactory, and perhaps rightly so. According to Rosenshine, it would also be difficult to increase academic time by reducing noninstructional time, much of which is made necessary by the diversity of school activities. For example, the majority of noninstructional time is spent in "transitions," such as going to and from lunch and recess. Even within allocated time, a certain amount of nonengaged time seems to be necessary and desirable. It takes time to distribute and collect books and papers, and, even in the most efficient classrooms, students sometimes wait for help, corrections, and instructions. Rosenshine suggests that such activities are made necessary by large classes and diverse students.

Thus, it may be difficult to find more time for academics within the present schoolday. The effects of lengthening the schoolday were not examined by the BTES. Although increasing allocated time within the limits of the study brought about increases in engagement, the study does not tell us whether it would be productive or counterproductive to lengthen the schoolday.

Another reason it is likely to be difficult for policymakers to effect improvements through mandates based on the BTES, is that it is not possible to tell a teacher exactly what to do to implement BTES findings. The teacher behaviors isolated in the BTES are not discrete activities which may be demonstrated and copied. They are functions such as presentation and monitoring, which may be fulfilled in any number of ways, depending on the teaching situation. The teacher, rather than the policymaker, is in the best position to select activities to fulfill these functions, basing the choices on the immediate classroom situation and adjusting the activities as the situation in the classroom changes. Although there are some ongoing projects using BTES findings in staff development (e.g., Fisher and Marliave, 1978), at present there is little to help the policymakers explain how a teacher could implement BTES ideas.

Finally, even if the study were to give policymakers all of the answers about effective teaching, policymakers could not be sure that mandates based on the study would be effective. In *Henry IV, Part I*, Glendower brags:

> I can call spirits from the vasty deep.

Hotspur replies:

> **Why, so can I, or so can any man;**
> **But will they come when you do call for them?**

Indeed, the educational policymaker is in a similar position with respect to compliance with mandates. Important studies of educational change, such as the Rand Corporation study of Federal Programs Supporting Educational Change (Berman and McLaughlin, 1975), suggest that successful implementation of innovations occurs only when a school's faculty and staff members share in the decisions affecting them, when they develop a feeling of ownership of the innovation, and when they are allowed to adapt it to their own situation.

Any mandates by policymakers may be followed involuntarily, making it less likely that the resulting changes have the same positive effects as the voluntary actions of the teachers in the BTES sample. For example, let us consider the possibility of mandates based on the components of Academic Learning Time: allocated time, engaged time, and success rate. Mandating increases in allocated time would not guarantee that students would spend the time working attentively on appropriate materials. The time might be allocated, but teachers might not make the necessary effort to keep the students engaged. But even if teachers were required to increase engaged time, students might not be engaged in tasks of appropriate difficulty. Indeed, mandates to increase engaged time might increase the possibility that students would be given inappropriate tasks, for a teacher might be tempted to use whole-class instruction to maximize engagement, although this practice could result in many students working on tasks of inappropriate difficulty.

Thus, neither mandates to increase allocated time nor mandates to increase engaged time may be guaranteed to have beneficial effects. Further, the BTES does not provide enough information on which to base mandates of success rate. Although the results indicate that students would benefit by spending more time at a high rate of success than they typically do, the results are not definitive enough to prescribe rates of success to be mandated. Here we must continue to rely on the judgment of the informed teacher to interpret and adapt the findings.

Encouragement and Assistance From Policymakers

Rather than delivering mandates, an alternative course for policymakers wishing to make use of the BTES information is to share the ideas, encourage their use, and assist those who attempt to make their own changes. In preceding chapters, Fenstermacher, Miller, and Williams argue that teachers are not to be told exactly what to do but are to be given the information and assistance necessary to make their own improvements.

The role of sharing and assisting is a role the California Commission for Teacher Preparation and Licensing is following in its handling of the BTES results. When it conceived the study, it hoped that the study would help it write mandates, or "guidelines," for schools of education to follow in training teachers. It appears that the commission has abandoned these hopes (Denham, 1979). Instead, it has begun a program of dissemination through newsletters, publications, and conferences and a program of assistance through small grants for trying out BTES ideas in schools or universities.

Federal, State, and local educational policymakers could take on the role of encouragement and assistance through such activities as the following:

1. *Drastically reduce the size of classes.*

Glass and Smith (1978, p. 46) stated that there is "little doubt" that "more is learned in smaller classes." Based on an exhaustive study of data on nearly 900,000 students, they concluded that student achievement increases as class size decreases, particularly when the class size goes below 20 pupils.

The BTES may provide us some of the reasons for this phenomenon. Fisher and his colleagues (1978, p. 15) report that more substantive interaction between the student and an instructor is associated with higher levels of student engagement. Substantive interaction consists of presenting information, monitoring work, and giving feedback. It may be that it is possible for teachers to provide more substantive interaction in smaller classes. Cahen and Filby (1979) are conducting a study to determine aspects of instruction in smaller classes which account for the achievement advantages.[1] Reducing class size is, of course, a very expensive option, but there may be instances in which the benefits would be well worth the expense.

2. *Provide aides, parent volunteers, and tutors.*

This action should help teachers increase the amount of substantive interaction and, presumably, increase engagement rates.

Although engagement rates are higher in group work than in seatwork, in which the student works alone, if a teacher were to use whole-class instruction all of the time, the pace would be too slow for some and too fast for others. In the typical second- or fifth-grade classroom, much time is spent with students divided into three groups. Since the teacher can work with only one group at a time, aides, volunteers, or tutors could help students in the other groups, providing substantive interaction and, presumably, increasing engagement rates. It seems reasonable to believe that classroom helpers with some training could perform many of the tasks of monitoring and feedback. Provided they knew the answers to the problems on which students are working, they could go from student to student monitoring work and providing feedback. The relationship of academic feedback to achievement is one of the strongest in the study. Of course, aides would have to be carefully selected, adequately trained, and suited to the conditions and needs of the classroom in which they were placed.

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[1] The work is being conducted under a grant (No. OB-NIE-G-78-0103) from the National Institute of Education. The report by Glass and Smith (1978) was produced under this grant, for which Cahen and Filby are Project Directors.

3. *Reduce classroom interruptions.*

A visitor to a typical school might notice many things happening besides instruction. There are announcements, telephone calls, forms to complete, reports to make, and individual students called out of classrooms. This is due in part to local procedures, but State and federally funded programs have added to the number of distractions (Acland and Denham, 1979). The BTES emphasis on efficient use of time calls our attention to the problems of repeated interruptions.

4. *Support training for teachers and teacher candidates.*

The BTES suggests that there are many things for teachers to learn: how to manage time, measure Academic Learning Time, reduce incidents of inappropriate student behavior, and perform the necessary teaching functions. The cooperative training program described by Miller in an earlier chapter suggests ways to provide this training.

5. *Explore the use of Academic Learning Time as an indicator of equality of educational opportunity.*

Defining equality in terms of equal educational resources ignores the fact that some students need special assistance. Defining equality in terms of equal achievement outcomes places an almost impossible burden on educational institutions. Equality of Academic Learning Time falls somewhere between the other two definitions and may be a practical and desirable goal.

6. *Emphasize student success.*

The BTES suggests that students could benefit from spending more time on tasks at which they are successful. Positive effects of high success rates were exhibited in attitudes as well as in achievement.

Policymakers must, of course, consider the many functions of schools, among them the function of categorizing and selecting students. However, undue attention to the selection function may deprive some students of sufficient successful experiences.

Finally, policymakers could probably encourage others to consider BTES ideas by using some of the ideas in their own decisions and reports of these decisions. For example, policymakers tempted to add new responsibilities to the schools might consider how new responsibilities might affect time available for the current program. In addition, many decisions in education would yield to an analysis of how allocated and engaged time would be affected–the length of class periods, class size, and transportation, for example.

Summary

At a time when "back-to-basics" is popular, there is a danger that the BTES may be misunderstood. When the casual reader of the reports thinks of ALT, he or she might think of straight rows of desks and long periods spent in academic drills. But BTES researchers argue that BTES ideas can be used in classrooms with different educational philosophies and goals. It would be unfortunate if policymakers moved too quickly toward mandates based on BTES. The potential benefits of the BTES lie not in mandates by policymakers but in the extent to which it leads to increased understanding by those involved in education.

The study brings us encouraging news. Popular interpretations of the Coleman report (Coleman et al., 1966) left the impression that schools and teachers are unimportant. The BTES brings us the encouraging message that teacher time and student time are important and that, by implication, both teachers and students are important. In short, the teachers need time to teach and the students need time to learn. The BTES, with its Academic Learning Time concept, gives us a way of thinking about and observing the amount of learning that is occurring.

Bibliography

Acland, H., and Denham, C. "Less Money, More Administration?" *California Teacher* 32 (March 1979): 9.

Anderson, L.W. "Student Involvement in Learning and School Achievement." *California Journal of Educational Research* 26 (1975): 53-62.

——. Time and School Learning. Unpublished doctoral dissertation. University of Chicago, 1973.

Anderson, R.C. "The Notion of Schemata and the Educational Enterprise: General Discussion of the Conference." In R.C. Anderson, R.J. Spiro, and W.E. Montague, (eds.) *Schooling and the Acquisition of Knowledge*. Hillsdale, N.J. Lawrence Erlbaum Associates, 1977.

Anglin, L. "The School Organization and Curriculum–Institutional Decision Making." Technical Report No. 398. Madison, Wis.: Wisconsin Research and Development Center, 1976.

Arlin, M.N. Learning Rate and Learning Rate Variance Under Mastery Learning Conditions. Unpublished doctoral dissertation. University of Chicago, 1973.

Atkinson, R.C. "Computer-Based Instruction in Initial Reading." In *Proceedings of the 1967 Invitational Conference on Testing Problems*. Princeton, N.J.: Educational Testing Service, 1968.

Attwell, A.A., Orpet, R.E., and Meyers, C.E. "Kindergarten Behavior Ratings as a Predictor of Academic Achievement." *Journal of School Psychology* 6 (1967): 43-46.

Belgard, M., Rosenshine, B., and Gage, N.L. "The Teacher's Effectiveness in Explaining: Evidence on Its Generality and Correlation With Pupils' Ratings and Attention Scores." In Gage *et al., Technical Report No. 4*. Stanford: Stanford Center for Research and Development in Teaching, 1968.

Bentzen, Mary M. *Changing Schools: The Magic Feather Principle*. New York: McGraw-Hill, 1974.

Berliner, D.C. "Impediments to the Study of Teacher Effectiveness." *Journal of Teacher Education* 27 (1976): 5-13.

——. *The Beginning Teacher Evaluation Study: Overview and Selected Findings, 1974-75*. San Francisco: Far West Regional Laboratory for Educational Research and Development, 1975.

——, Filby, N., Marliave, R., and Weir, C. "An Intervention in Classrooms Using the Beginning Teacher Evaluation Study Model of Instruction." In *Beginning Teacher Evaluation Study*. Technical Report VI-1. San Francisco: Far West Regional Laboratory for Educational Research and Development, 1978.

——, Fisher, C.W., Filby, N., and Marliave, R. *Executive Summary of Beginning Teacher Evaluation Study*. San Francisco: Far West Regional Laboratory for Educational Research and Development, 1978.

——. *Proposal for Phase III of Beginning Teacher Evaluation Study*. San Francisco: Far West Regional Laboratory for Educational Research and Development, 1976.

—— and Rosenshine, Barak. "The Acquisition of Knowledge in the Classroom." Technical Report IV-1. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1976.

Berman, P., and McLaughlin, M.W. Federal Programs Supporting Educational Change, vols. 1-8. Santa Monica, Calif.: RAND Corporation (R-1589/4-HEW), April 1975.

Berman, Paul, and Pauley, E. "Federal Programs Supporting Educational Change." In *Factors Affecting Change Agent Projects*. Santa Monica, Calif.: RAND Corporation, April 1975.

Bjarnason, L. "Relation of Class Size to Control of Attention." *Elementary School Journal* 26 (September 1925): 36-41.

Block, J.H. "The 'C' in CBE." *Educational Researcher* 7 (May 1978): 13-16.

——. "Introduction to Mastery Learning: Theory and Practice." In J.H. Block, ed., *Mastery Learning: Theory and Practice*. New York: Holt, Rinehart and Winston, 1971 (a).

——. ed. *Mastery Learning: Theory and Practice*. New York: Holt, Rinehart and Winston, 1971.

——. "Teachers, Teaching and Mastery Learning." *Today's Education* 63 (1973): 30-36.

—— and Anderson, L.W. *Mastery Learning and Classroom Instruction*. New York: Macmillan Co., 1975.

—— and Anderson, L.W. "Mastery Learning." In Donald J. Treffinger *et al.*, eds., *Handbook on Teaching Educational Psychology*. New York: Academic Press, 1977.

—— and Burns, R.B. "Mastery Learning." In Lee Shulman, ed., *Review of Research in Education*. Itasca, Ill.: F.E. Peacock, 1977.

Bloom, B.S. *Human Characteristics and School Learning*. New York: McGraw-Hill, 1976.

——. "Individual Differences in School Achievement: A Vanishing Point?" *Phi Delta Kappan* 50 (1971).

——. "The 1955 Normative Study of the Tests of General Educational Development." *School Review* 64 (1956): 110-124.

——. "Recent Developments in Mastery Learning." *Educational Psychologist* 10 (1973): 204-221.

——. "Thought Processes of Students in Discussion Classes." In S.J. French, ed., *Accent on Teaching*. New York: Harper and Brothers, 1954.

——. "Time and Learning." *American Psychologist* 29 (September 1974): 682-688.

——. Time and Learning. Thorndike Address, 81st annual convention of the American Psychological Association. Montreal, 1973.

—— and Statler, C.R. "Changes in the States on the Tests of General Educational Development from 1943 to 1955." *School Review* 65 (1957): 204-221.

Blume, C.E. "Techniques in the Measuring of Pupil Attention." In *The National Conference of Supervisors and Directors of Instruction, Second Yearbook*. New York: Bureau of Publications, Teachers College, Columbia University, 1929.

Borg, W.R. Teaching Coverage of Academic Content and Pupil Achievement. Unpublished manuscript, 1978.

Brophy, J.E., and Good, T.L. *Teacher-Student Relationships: Causes and Consequences*. New York: Holt, Rinehart and Winston, 1974.

Broudy, H.W. *The Real World of the Public Schools*. New York: Harcourt Brace Jovanovich, 1972.

Cahen, L.S. "Selection of Second and Fifth Grade Target Students for Phase III-B." In *Beginning Teacher Evaluation Study*. Technical Note III-1. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, January 1977.

—— and Filby, N.N. "The Class Size/Achievement Issue: New Evidence and a Research Plan." *Phi Delta Kappan* 60 (March 1979): 492-495, 538.

Carroll, J. "Fitting a Model of School Learning to Aptitude and Achievement Data Over Grade Levels." *Research Bulletin*, No. 51, Princeton, N.J.: Educational Testing Service, 1973.

——. "Fitting a Model of School Learning to Aptitude and Achievement Data Over Grade Levels." in D.R. Green, ed., *The Aptitude–Achievement Distinction*. Monterey, Calif.: CTB/McGraw-Hill, 1974.

——. "A Model for School Learning." *Teachers College Record* 64 (1963): 723-733.

——. "Problems of Measurement Related to the Concept of Learning for Mastery." In J.H. Block, ed., *Mastery Learning: Theory and Practice*. New York: Holt, Rinehart and Winston, 1971.

——. "A Revisionist Model of School Learning." *Review of Education* 3 (1977): 155-167.

Chall, J.S., and Feldman, S.C. *A Study in Depth of First Grade Reading*. USOE Co-Op Research Project No. 2728. New York: The City College of the City University of New York, 1966.

Chang, S.S., and Raths, J. "The Schools' Contribution to the Cumulating Deficit." *Journal of Educational Research* 64 (1971): 272-276.

Cohen, D.K., and Weiss, J.A. "Social Science and Social Policy: Schools and Race." In R.C. Rist and R.J. Anson, eds., *Education, Social Science and the Judicial Process*. New York: Teachers College Press, 1977.

Cohen, S.A. "The Taxonomy of Instructional Treatments in Reading: Its Uses and Its Implications as a Classroom Analysis Scheme." *Journal of the Reading Specialist* 2 (October 1971): 5-20.

——. *Teach Them All To Read: Theory, Method and Materials for Teaching the Disadvantaged*. New York: Random House, 1969.

Coleman, J.S. *et al. Equality of Educational Opportunity*. Washington, D.C.: U.S. Government Printing Office, 1966.

Comber, L.C., and Keeves, J.P. *Science Education in Nineteen Countries: International Studies in Evaluation: I*. New York: Wiley, 1973.

Crandall, David. "Training and Supporting Linking Agents." In Nickolas Nash and Jack Culbertson, eds., *Linking Processes in Educational Improvement*. Columbus: University Council for Educational Administration, 1977.

Cremin, L. *The Transformation of the School: Progressivism in American Education 1876-1957*. New York: Vintage, 1964.

Denham, C. "Toward a Dialogue Between Researchers and Practitioners." *The Generator*, AERA Division G newsletter 8 (1979).

——. Utilizing Research: Can We Agree on the Findings? Presented at the annual meeting of the American Educational Research Association, Toronto, Canada, March 1978.

Dewey, J. *The Sources of a Science of Education*. New York: Liveright, 1929.

Dishaw, M.M. "Descriptions of Allocated Time to Content Areas for the A-B Period." Technical Note IV-2a. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Laboratory for Regional Educational Research and Development, July 1977(a).

——. "Descriptions of Allocated Time to Content Areas for B-C Period." Technical Note IV-2b. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.; Far West Regional Laboratory for Educational Research and Development, August 1977(b).

Doyle, W. "Paradigms for Research on Teacher Effectiveness." In L. Schulman, ed., *Review of Research in Education 5*. Itasca, Ill. F.E. Peacock, 1977.

Dunkin, M., and Biddle, B. *The Study of Teaching*. New York: Holt, Rinehart and Winston, 1974.

Edminston, R.W., and Braddock, R.W. "Study of the Effect of Various Teaching Procedures Upon Observed Group Attention in the Secondary School." *Journal of Educational Psychology* 32 (December 1941): 665-672.

—— and Rhoades, B.J. Predicting Achievement. *Journal of Educational Research* 51 (1969): 177-180.

Eisner, Elliott W., and Vallance, Elizabeth, eds. *Conflicting Conceptions of Curriculum*. Berkeley, Calif.: McCutchen Publishing Corporation, 1974.

Emrick, John, and Peterson, Susan. Synthesis of *Five Recent Studies of Educational Dissemination and Change*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, January 1978.

Farrar, Eleanor, De Sanctis, John, and Cohen, David. "Alternative Conceptions of Implementation." Paper published by The Huron Institute, October 1978.

Fenstermacher, G.D. "A Philosophical Consideration of Recent Research on Teacher Effectiveness." In L.S. Shulman, ed., *Review of Research in Education 6*. Itaska, Ill.: F.E. Peacock, 1979.

Filby, Nikola. "An Overview and Future Activities." Newsletter, Beginning Teacher Evaluation Study. Sacramento, Calif.: Commission for Teacher Preparation and Licensing, 1978.

—— and Cahen, L.S. "Teaching Behavior and Academic Learning Time in the A-B Period." Technical Note V-1b. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1977.

—— and Cahen, L.S. "Teaching Behavior and Academic Learning Time in the B-C Period." Technical Note V-2b. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1978.

—— and Dishaw, M.M. "Refinement of Reading and Mathematics Tests Through an Analysis of Reactivity." Technical Report III-6. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1976.

—— and Marliave, R.S. "Descriptions of Distributions of ALT Within and Across Classes During the A-B Period." Technical Note IV-1a. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, September 1977.

Fisher, C.W., and Berliner, D.C. "Quasi-Clinical Inquiry in Research on Classroom Teaching and Learning." Technical Report VI-2. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1977.

——, Berliner, D., Filby, N., Marliave, R., Cohen, L., Deshaw, M., and Moore, J. *Teaching and Learning in Elementary Schools: A Summary of the Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1978.

——, Filby, N.N., and Marliave, R.S. "Descriptions of Distributions of ALT Within and Across Classes During the B-C Period." Technical Note IV-1b. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, October 1977.

——, Filby, N.N., Marliave, R.S., Cahen, L.S., Dishaw, M.M., Moore, J.E., and Berliner, D.C. "Teaching Behaviors, Academic Learning Time and Student Achievement: Final Report of Phase III-B, Beginning Teacher Evaluation Study." Technical Report V-1. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1978.

—— and Marliave, R.S. *Program on Teacher Development and Academic Learning Time: Technical Proposal*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, April 1978.

—— *et al.* Technical Report V-I. *BTES Technical Report Series*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1978.

Fredrick, W.C. "The Use of Classroom Time in High Schools Above or Below the Median Reading Score." *Urban Education* (1977): 459-464.

Gage, N.L. "Paradigms for Research on Teaching." In N.L. Gage, ed., *Handbook of Research on Teaching*. Chicago. Rand McNally, 1963.

——. *The Scientific Basis of the Art of Teaching*. New York: Teachers College Press, 1978.

Glaser, R. "Adapting the Elementary School Curriculum to Individual Performance." In *Proceedings of the 1967 Invitational Conference on Testing Problems*. Princeton, N.J.: Educational Testing Service, 1968.

——. "Educational Psychology and Education." *American Psychologist* 28 (1973): 557-566.

Glass, G.V., and Smith, M.L. Meta-Analysis of Research on the Relationship of Class Size and Achievement. Boulder, Col.: Laboratory of Educational Research, University of Colorado, September 1978.

Good, T.L., and Beckerman, T.M. "Time on Task: A Naturalistic Study in Sixth-Grade Classrooms." *The Elementary School Journal* 73 (1978): 193-201.

Goodlad, John. *The Dynamics of Educational Change*. New York: McGraw-Hill, 1975.

Goodlad, John I., Klein, M. Frances, *et al. Looking Behind the Classroom Door*. Worthington, Ohio: Charles A. Jones Publishing Co., 1974.

Green, T.F. *The Activities of Teaching*. New York: McGraw-Hill, 1971.

Guthrie, J.T., Martuza, V., and Seifert, M. *Impacts of Instructional Time in Reading*. Newark, Del.: International Reading Association, 1976.

Hall, Gene, and Loucks, Susan. "Personalizing Staff Development." *Teachers College Record* 80 (September 1978): 36-53.

Harnischfeger, A., and Wiley, D.E. "Exposure to Schooling: Method, Conclusions, Policy." *Educational Researcher* 5 (February 1976).

——. Teaching-Learning Processes in Elementary Schools: A Synoptic View. Chicago: University of Chicago, Studies of Educative Processes, Report No. 9, February 1975.

Holmes, H.W. "Time Distributions by Subjects and Grades in Representative Cities." In S.C. Parker, ed., *The Fourteenth Yearbook of the National Society for the Study of Education, Part I, Minimum Essentials in Elementary-School Subjects–Standards and Current Practices*. Chicago: University of Chicago Press, 1915.

House, Ernest. *Politics of Educational Innovation*. Berkeley, Calif.: McCutchan Publishing, 1974.

Howey, Kenneth; Yarger, San; and Joyce, Bruce. "Reflections on Preservice Preparation: Impressions from the National Survey. Part III: Institutions and Programs." *Journal of Teacher Education* 24 (January-February 1978): 38-40.

Hudgins, B.B. "Attending and Thinking in the Classroom." Paper presented by the American Psychological Association Meeting, New York, September 1966.

Husen, T., ed. *International Study of Achievement in Mathematics: A Comparison of Twelve Countries*. New York: Wiley, 1967.

Hymel, G.M., and Gaines, W.G. "An Investigation of John B. Carroll's Model of School Learning as a Basis for Facilitating Individualized Instruction by Way of School Organizational Patterning." Paper presented at the annual meeting of the American Educational Research Association, New York, April 1977.

Jackson, P.W. *Life in Classrooms*. New York: Holt, Rinehart and Winston, 1968.

Jencks, C.S., Smith, M., Acland, H., Bane, M.J., Cohen, D., Gintis, H., Heyns, B., and Michelson, S. *Inequality: A Reassessment of the Effect of Family and Schooling in America*. New York: Basic Books, 1972.

Jespersen, J., and Fitz-Randolph, J. *From Sundials to Atomic Clocks*. Washington, D.C.: National Bureau of Standards, 1977.

Joyce, Bruce, *et al.* "Reflections on Preservice Preparation: Impressions from the National Survey. Part 1: First Impressions." *Journal of Teacher Education* 28 (September-October 1977): 14-15.

Karweit, N. "The Organization of Time in Schools: Time Scales and Learning." Paper presented at the NIE Conference on Schooling, San Diego, Calif., 1976.

——. "Quantity of Schooling: A Major Educational Factor?" *Educational Researcher* 5 (February 1976) 15-17.

Kepler, Karen B. "The Evaluative Environment of Classrooms." Unpublished Ph.D. dissertation, The University of Chicago, June 1978.

Kidder, S.J., O'Reilly, R.P., and Kisling, H.J. "Quantity and Quality of Instruction: Empirical Investigations." Paper presented at the American Educational Research Association meeting, Washington, D.C., March 1975.

Kliebard, H. "Metaphorical Roots of Curriculum Design." *Teachers College Record* 73 (1972): 403-404.

Kounin, J.S. *Discipline and Group Management in Classrooms*. New York: Holt, Rinehart and Winston, 1970.

Krauskopf, C.J. "Use of Written Responses in the Stimulated Recall Method." *Journal of Educational Psychology* 54 (1963): 172-176.

Lahaderne, H.M. "Attitudinal and Intellectual Correlates of Attention: A Study of Four Sixth Grade Classrooms." Presented at the American Educational Research Association meeting, New York, February 1967.

Leiter, Maurice, and Cooper, Myrna. "How Teacher Unionists View In-Service Education." *Teachers College Record* 80 (September 1978): 107-125.

Lewin, K. *Field Theory in Social Sciences*. New York: Harper and Brothers, 1951.

Lieberman, Ann. "Emerging Role of the Linking Agent: Some Problems and Prospects." In Michael Milstein, ed., *Schools, Conflict and Change*. New York: Teachers College Press, 1979.

——. "Linking Processes in Educational Change." In Nickolas Nash and Jack Culbertson, eds., *Linking Processes in Educational Improvement*. Columbus, Ohio: University Council for Educational Administration, 1977.

——. "Political and Economic Stress and the Social Reality of Schools." *Teachers College Record* (December 1978).

—— and Miller, Lynne. *Staff Development: New Demands, New Realities, New Perspectives*. New York: Teachers College Press, 1979.

Lortie, Daniel. *School Teacher*. Chicago: University of Chicago Press, 1975.

Macdonald, James B., Wolfson, Bernice J., and Zaret, Esther. *Reschooling Society: A Conceptual Model*. Washington, D.C.: Association for Supervision and Curriculum Development: 1973.

Mann, C.H. *How Schools Use Their Time: Practice in 444 Cities Including a Study of Trends From 1826 to 1926*. New York: Teachers College, Columbia University, 1928.

Marliave, R.S., Fisher, C.W., Filby, N.N., and Dishaw, M.M. "The Development of Instrumentation for a Field Study of Teaching." Technical Report I-5, In *Beginning Teacher Evaluation Study*. San Francisco, Calif.; Far West Regional Laboratory for Educational Research and Development, February 1977.

——. "Academic Learning Time and Student Achievement in the A-B Period." Technical Note V-1a. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1977.

——. "Academic Learning Time and Student Achievement in the B-C Period." Technical Note V-2a. In *Beginning Teacher Evaluation Study*. San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1978.

McDonald, F. *Beginning Teacher Evaluation Study, Phase II*. Princeton, N.J.: Educational Testing Service, 1976.

——. "Evaluating Preservice Teachers' Competence." *Journal of Teacher Education* 29 (March-April 1978): 9-13.

—— and Elias, P. *Executive Summary Report: Beginning Teacher Evaluation Study, Phase II*. Princeton, N.J.: Educational Testing Service, 1976.

McLaughlin, Milbrey, and Marsh, David D. "Staff Development and School Change." *Teachers College Record* (September 1978): 69-94.

Morsh, J.E. *Systematic Observations of Instructor Behavior*. Developmental Report (AFPTRC-TN-56-32). San Antonio, Texas: Air Force Personnel and Training Research Center, Lackland AFB, 1956.

Nieman, H., and Gastright, F. "Preschool Plus All-Day-Kindergarten: The Cumulative Effects of Early Childhood Programs on the Cognitive Growth of Four and Five Year Old Children." Presented at the annual meeting of the American Educational Research Association, Washington, D.C., March 1975.

Ozcelik, D.A. Student Involvement in the Learning Process. Unpublished doctoral dissertation, University of Chicago, 1973.

Payne, B.R. *Public Elementary School Curricula*. New York: Silver, Burdett and Co., 1905.

Perrow, C. "A Framework for the Comparative Analysis of Organizations." *American Sociological Review* 14 (1969): 194-208.

Peterson, P. A Review of the Research on Mastery Learning Strategies. Unpublished manuscript. Stanford, Calif.: Stanford Center for Research and Development in Teaching, 1972.

Pinar, William F. "Notes on the Curriculum Field 1978." *Educational Researcher* 7 (September 1978).

Pipho, G., ed. "Minimum Competency Testing." *Phi Delta Kappan* Special Issue 59 (1979): 585-629.

Pirsig, R.M. *Zen and the Art of Motorcycle Maintenance*. New York: William Morrow, 1974.

Popham, W.J. *Criterion-Referenced Measurement*. Englewood Cliffs, N.J.: Prentice-Hall, 1978.

Proceedings of the National Invited Conference on School Organization and Its Effects. Washington, D.C.: National Institute of Education, 1978.

Reynolds, Maynard. "Networks of Teacher Educators: An Approach to Public Law 94-142." Delivered at the Conference on Teacher Education Research, Austin, Texas, January 1979.

Rogers, E. *Diffusion of Innovations*. New York: The Free Press of Glencoe, 1962.

Romberg, T. "The Diagnostic Process in Mathematics Instruction." Presented at the National Conference on Remedial Mathematics, Kent State University, 1974.

Rosenshine, B. "Academic Engaged Time, Content Covered, and Direct Instruction" (mimeographed). Champaign-Urbana: University of Illinois, 1978.

——. "Classroom Instruction." In *The Psychology of Teaching Methods*, NSSE 75th Yearbook. Chicago: University of Chicago Press, 1976.

——. "Instruction Principles in Direct Instruction." Presented to the annual meeting of the AERA, Toronto, 1978.

——. *Teaching Behaviors and Student Achievement*. Windsor, Berkshire, England: National Foundation for Educational Research in England and Wales, 1971.

Rutherford, William. *Concerns of Teachers About Implementing the Innovation of Team Teaching*. Austin: Research and Development Center for Teacher Education, University of Texas, 1975.

Sarason, Seymour. *The Culture of the School and the Problem of Change*. Allyn and Bacon, 1972.

Scheffler, I. "Reflections of Educational Relevance." In R.S. Peters, ed., *The Philosophy of Education*. London: Oxford University Press, 1973.

Schiffer, Judith. "A Framework for Staff Development." *Teachers College Record* (September 1978).

Schmidt, W.H. "The Quantity of School in Different Subject Matter Areas and Its Relationships to Achievement." Presented at the annual meeting of the American Educational Research Association, Toronto, March 1978.

Schrag, F. "Teaching/Healing: The Medical Analogy." *Teachers College Record* 72 (1971): 594-604.

Schwab, Joseph. *The Practical: A Language for Curriculum*. Washington, D.C.: National Education Association, 1970.

Shannon, J.R. "Homogeneous Grouping and Pupil Attention in Junior High School." *Teacher's College Journal* 12 (January 1941): 49-52.

——. "Measure of the Validity of Attention Scores." *Journal of Educational Research* 35 (April 1942): 623-631.

Siegel, L. *et al.* "Students' Thoughts During Class: A Criterion of Educational Research." *Journal of Educational Psychology* 54 (1963): 45-61.

Sjogren, D.D. "Achievement as a Function of Study Time." *American Educational Research Journal* 4 (1967): 337-343.

Soar, R.S. *An Integrative Approach to Classroom Learning*. Final Report, Public Health Service Grant 5-R11-M11 02045. Philadelphia, Pa.: Temple University, 1966.

"The Social Realities of Teaching." *Teachers College Record* 80 (September 1978): 54-68.

Spady, W.G. "Competency Based Education: A Bandwagon in Search of a Definition." *Educational Researcher* 6 (1977): 9-14.

Stallings, J.A., and Kaskowitz, D. *Follow-Through Classroom Observation Evaluation, 1972-73*. Menlo Park, Calif.: Stanford Research Institute, 1974.

"A Strategy for Teaching Values." A sound filmstrip program to accompany *First Things: Values.* New York: Guidance Associates, 1972.

Thompson, F.E. "Typical Experiments for Economizing Time in Elementary Schools." In S.C. Parker, ed., *The Fourteenth Yearbook of the National Society for the Study of Education, Part I, Minimum Essentials in Elementary School Subjects–Standards and Current Practices.* Chicago: University of Chicago Press, 1915.

Tikunoff, William J., and Marliave, Richard. *Beginning Teacher Evaluation Study: Special Study A: Anthropological Analysis of the Effects of the Social System of the Classroom and Teaching Effectiveness.* San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1978.

Torshen, K.P. *The Mastery Approach to Competency-Based Education.* New York: Academic Press, 1977.

Turnure, J.W., and Samuels, S.J. *Attention and Reading Achievement in First Grade Boys and Girls.* Research Report No. 43. University of Minnesota Research Development and Demonstration Center in Education of Handicapped Children, 1972.

Tyler, Ralph W. *Basic Principles of Curriculum and Instruction.* Chicago: University of Chicago Press, 1949.

Ward, Beatrice A., and Tickunoff, William J. *An Interactive Model of Research and Development.* San Francisco, Calif.: Far West Regional Laboratory for Educational Research and Development, 1975.

Weick, Karl. "Educational Organizations as Loosely Coupled Systems." *Administrative Science Quarterly* 21 (March 1976).

Welch, W.W., and Bridgham, R.G. "Physics Achievement Gains as a Function of Teaching Duration." *School Science and Mathematics* 68 (1968): 449-454.

Wiley, D.E. "Another Hour, Another Day: Quantity of Schooling, a Potent Path for Policy." In W.J. Sewel, R.M. Hauser, and D.L. Featherman, eds., *Schooling and Achievement in American Society.* New York: Academic Press, 1976.

—— and Harnischfeger, A. "Explosion of a Myth; Quantity of Schooling and Exposure to Instruction, Major Educational Vehicles." *Educational Researcher* 3 (1974): 7-12.

Williams, Richard C. "A Political Perspective on Staff Development." *Teachers College Record* 80 (September 1978): 95-106.

Wright, C.E., and Kim, Y. *A Stability Study of the Study Achievement Tests for the Beginning Teacher Evaluation Study.* Menlo Park, Calif.: Educational Evaluation and Research, Inc., 1977.

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